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ENGINEERING

DECORATION

CONSTRUCTION

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House at Washington, D. C.
(Gelatine Print issued only with Imperial Edition.)
The Johns Hopkins Hospital, Baltimore Md.
House at Bridgeport, Conn.
Competitive Design for the American Museum of Natural History, N. Y.
House at Plymouth, Mass.

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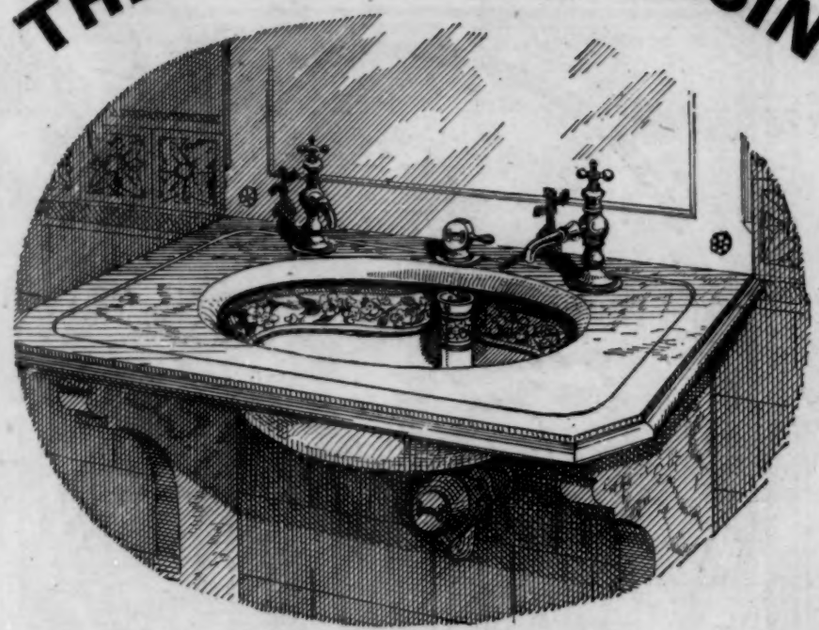

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WE have for some time been anxious about the competition for the Criminal Court Building in the City-hall Park in New York, and it looks as if our fears might be justified. It will be remembered that the time allowed for preparing the plans was very short, and that nothing was said about having the award made by experts, the terms offered thus violating two of the cardinal principles of professional ethics in regard to public competitions. It appears that thirteen designs were received, notwithstanding the shortness of the time allowed, and after the Sinking Fund Commissioners, who had the matter in hand, had held two meetings to consider them, and had contemplated them long and earnestly, they concluded that it would be well to call in some "experts" to tell them which was the best. "Experts" were accordingly chosen, in the persons of the Superintendent of Public Buildings, the Chief Engineer of the Croton Aqueduct, and the Engineer of the Finance Department, who were requested to select three of the designs and report to the Board of Commissioners. This rather queer jury did what was requested of it, and reported that, in its opinion, the design marked with "an angel holding a pair of scales;" that with the motto, "Examine me well," and the one with the motto, "*Droit en avant*," were the best adapted for execution. It seems to us that the author of the first one mentioned ought to have been awarded the prize at once for his ingenuity in personifying in his cipher New York criminal justice. regarded from the criminal's point-of-view, if for nothing else, but the Commissioners apparently failed to appreciate the talent shown in this device, and chose a committee of their own number which finally came to the same conclusion as the experts. During the discussion, the question of the compensation of the architect came up, and some one suggested that it was usual to pay him five per cent on the cost in such cases. This appeared to the Commissioners "exorbitant," and the new committee on the choice of plans was further instructed to inquire of the Corporation Counsel what was the law in the matter, and to fix the amount to be paid to the architect in accordance with the information thus received. The chances are, we suppose, that the Corporation Counsel will report that where an architect delivers himself up bodily to the tender mercies of his employer, as those who entered the competition seem to have done, there is no need of paying him anything more than the smallest sum he will accept, rather than be discarded altogether. We need not say that the consideration for which the substratum of the profession will relieve the owner of the trouble of dispensing a million and a half dollars is a very modest one, and if the Sinking Fund Commissioners are going to award their work to the architect who will do it cheapest, it is time for the honest competitors to withdraw their plans, and escape from the affair, before it becomes so unsavory as to disgrace all those who may have been connected, however innocently, with it.

THE International Congress of Architects, which began its sessions in Paris on the seventeenth of June, does not appear to have accomplished a great deal for the interests of the profession, although it was interesting, and quite fully attended. The official report of the proceedings has not yet reached us, but we glean from the various foreign papers an account of the most important part of the work accomplished. The first business was the election of officers, and M. Bailly, the President of the Société Centrale, was chosen President of the Convention, M. Charles Garnier was chosen Vice-President, and nine honorary Vice-Presidents were also chosen, four, MM. Daumet, Normand, Hermant and Guillaume, for France, Messrs. R. Phené Spiers and Herbert D. Appleton, for England, Mr. R. M. Hunt, who was present, for the United States, and Messrs. Leniman, for Germany, and Da Silva, for Portugal. After the President's address of welcome, the business of the Convention was opened by the reading of a paper on the "Teaching of Architecture," by M. de Baudot. The views of M. de Baudot, who was a friend and disciple of Viollet-le-Duc, are well-known to be unfavorable to the system pursued at the Ecole des Beaux-Arts, and he argued very effectively in favor of a more practical training for young architects, which should remove from them the reproach of being able only to make handsome water-color drawings. Although M. de Baudot was warmly applauded, the defenders of the present system of the Ecole des Beaux-Arts were probably in a majority in the Convention, and a little manœuvring took place between the two parties, in regard to the time at which the Convention should express by vote its opinion on the subject of the paper. A vote taken immediately after the reading of the paper would probably have been unfavorable to M. de Baudot's conclusions, and his friends endeavored, in consequence, to have the vote put off until a later day. The effort was successful, and a delay of three days was determined upon, in order that those holding views opposed to those of M. de Baudot and his friends might have time to present their side of the subject. This gave an opportunity for M. E. Guillaume, Professor of Architecture at the Ecole des Beaux-Arts, to make, on the third day of the Convention, an eloquent reply to the critics of the school, in which he referred to the ability and success with which the graduates of the school had practised construction, and said that the policy pursued there was to instil sound general principles, leaving individuals to apply these principles to the solution of the varying problems of each successive age. M. Guillaume's address was received with an enthusiasm which seems to have portended a rather lively contest when the time came for voting on the subject, and the Convention finally dodged the issue with great discretion, by adopting a resolution to refer the matter to the next Convention, which is not likely to be held for another ten years, at least.

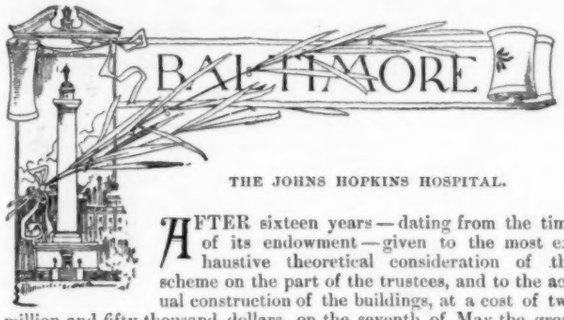
THE only other matter of great professional interest which came before the Convention was that of requiring architects to pass an examination and receive a diploma, before allowing them to practise. The arguments on both sides of this question are very familiar to us, and were presented with eloquence and force by M. Chevallier and others, but the Convention judiciously disposed of the matter in the same way as the previous one. Some resolutions were, however, passed, expressing the opinion of the Convention that means ought to be provided for pursuing advanced courses of architectural study in the professional schools, and that the property of architects in their designs ought to be protected in the same manner as that of other artists. The avoidance of exciting topics had at least the advantage of preserving the harmony of the meeting, and the uncontroversial papers, which were not very numerous, were listened to with complacency, while the excursions, to the great hall of the Trocadéro, the new Sorbonne, and other places, were much enjoyed, as was also the exhibition of portraits of architects, prepared by the Committee of Organization, which contained many curious old drawings of the professional heroes of past ages. The close of the proceedings was signalized by a banquet at the Hôtel Continental.

A CASE was decided by the civil tribunal at Brussels not long ago which has a considerable interest for architects. D, an architect, brought suit against O for six hundred and fifty dollars, balance of commission for the erection of a villa at Ostend, together with a further sum of seventy-three dollars, advanced for travelling expenses, fifty of which were spent in a trip to Berlin. A second claim was made for commission and travelling expenses for preparing a sketch for alterations in a city house for the same owner. In reply, it was claimed that the travelling expenses of architects were included in their commission; that the journey to Berlin was not requested or authorized by the defendant; that the work was unnecessarily delayed by the fault of the architect, so that the owner was not able to use his house until a year after the time when the contract required that it should be done; and that various defects, due to the fault of the architect, had been discovered and remedied, at a great expense, which ought justly to be paid by the architect. The court decided that the balance of commission claimed by the architect was moderate and fair, being calculated at the rate of five per cent on the cost; that necessary travelling expenses were properly charged in addition to the commission, but that the journey to Berlin had not been shown to have been either necessary or made at the request of the defendant; and that a commission of one per cent on the probable cost, with travelling expenses, was a proper charge for the sketches for the alteration which was not carried out. In regard to the counter-claims made by the defendant, the court found from the evidence that the contractor was ready to complete the building in the early spring, but that the cut stone, which was delivered from the quarry on a different contract, was not delivered in time to be used as it was wanted, through the fault of the architect, who was proved not to have sent the stone-drawings to the quarry until after the time when the contract required the roof to be on, so that the completion of the building was delayed through this cause until the following season; and decided that the architect ought to pay interest at the legal rate of five per cent for a year on the cost of the land, with the sums which had been paid by the owner on account of his building up to the time when he had expected to have it ready for occupancy, as compensation to the owner for the unexpected loss of the use of his capital for that period. In regard to the damage suffered by the bad construction of the building, owing to the architect's fault, the defendant admitted that the architect had not been called in or notified at the time when the alleged defects were investigated, but said that he could prove by ample expert evidence that the defects existed, and that they were due to the fault of the architect; but the court refused to hear his witnesses, saying that expert investigations of the architect's work made without notifying him to be present could not be admitted as evidence against him; and that as the defendant, by making repairs and changes on the recommendation of his experts, had obliterated the traces of the architect's misconduct, if they ever existed, he had by his own act made it now impossible to establish by a proper expert examination, under the order of the court, the faults that he alleged, and could not sustain any claim founded on them.

THE trades-unions in San Francisco came into collision the other day with a force which they will probably find considerably less amiable and easy of circumvention than the civil law. The committee of citizens which had in charge the arrangements for the celebration of the Fourth of July resolved to offer only six dollars per man for the services of the musicians in the bands, instead of the eight dollars which had been paid on previous occasions. The Musicians' Union thereupon issued orders that none of its members should play for the Citizens' Committee, and the Federated Trades organization came to its aid by forbidding any of its members who might be skilled in music from trying to take the places of the members of the Musicians' Union. As both parties remained firm, the Fourth of July procession marched without any music. It happened, however, that among the musicians who were expected to take part in it were the members of three regimental bands, who, although they belonged to the Musicians' Union, were regularly enlisted men in their several regiments of militia. Upon their failure to appear for duty, the colonels of their regiments took up the code of militia regulations to inquire into the duties of enlisted musicians. The code informed them that the appearance of all members of the regiments was obligatory in California at the parade on the Fourth of July, and the musicians are to be brought before a court-martial and tried for mutiny. As the officers concisely put the case, "If some non-military body has more power over any part of the military force stationed in San Francisco than the commander-in-chief, it is a better time to learn it now than to wait until an emergency arises, and they or other similar societies array themselves against the law and the officers appointed to administer the same." Most people will quite agree with the officers of the militia that it is time to find out how far the loyalty of these most necessary defenders of the peace can be depended upon, and a salutary example might be made of the first offenders by visiting upon them a punishment suitable to so gross a military fault.

ANOTHER instance of practical trades-unionism is reported from New York. A laborer applied for employment to the contractors for the new *World* Building, and, being known to be faithful and industrious, he was furnished with a hod, and set at work. His manner of performing his duty, however, proved very displeasing to his companions. If he had been left to himself, he would have carried so many bricks in a day that he would have saved his employers quite a little time and money, and even as it was, his efforts to work industriously caused his fellow workmen great disgust, and even annoyance, for after his hod was filled, his rapidity in carrying it to the place where the bricks were wanted left such a small space between him and the next hod-carrier in front of him, as compared with that which intervened between him and the next man behind him, as to give occasion to remarks from the spectators, somewhat to the disadvantage of the rear portion of the procession. It may be imagined how intolerable this levity was to the haughty favorites of politicians and cheap newspapers, and as there was no hod-carriers' union, to stop all the building-work in the city until the offender was driven into starvation, his companions decided to apply suitable remedies to the case on their own account. After several warnings, to the effect that he must work more slowly, which, rather from force of habit than malicious disobedience, were not satisfactorily heeded, the man next in front of him in the line which was returning with empty hods, seizing the opportunity, as his victim came up behind him, turned and raised the hod, and with the remark that he would "stop that business," brought it down on the industrious man's head, with a blow which laid him senseless and bleeding on the ground. A hospital surgeon was called, who sewed up the wound, and the industrious man was helped away, not to return. Whether he and his family, having found honest work in New York too dangerous a way of getting a living, are now begging in the streets, the *Tribune*, which tells the story, does not inform us, and it says that the man's employers were too busy to make any inquiries on the subject.

MR. EDWARD ATKINSON makes, in the *Paper World*, some interesting suggestions in regard to the possible use of wood-fibre as a building material. He thinks that both for roofing and for inserting in walls between the studs of a frame house, either wood-fibre in the shape of slabs, or straw-board in the same form, might prove a cheap and good material. From some experience of ours with straw-board intended to be used in that way, we doubt very much whether either this or wood-fibre could be economically used in place of plastering or shingles for ordinary buildings, although a very rough paper might possibly be made with wood-fibre, like the German "wood-cement" roofing-paper, which would serve a good purpose either with or without the addition of coats of tar. For certain other building purposes, however, the "indurated" fibre, such as pails and dishes are made of, might be very useful. Bath-tubs are already made of it, which seem to be serviceable, and if it could be readily moulded from architects' designs, like *papier-maché*, it might, we should think, be used to wainscot the inside of stone and brick walls. Being, when properly treated, impervious to water, it could be applied directly to the masonry, so as to avoid the inconvenience and danger of wooden furring, and the expense and other objectionable qualities of the terra-cotta and cement linings. As it would not warp or shrink, it would be much better than wood for such decorations, particularly where delicate painting was intended.



THE JOHNS HOPKINS HOSPITAL.

AFTER sixteen years — dating from the time of its endowment — given to the most exhaustive theoretical consideration of the scheme on the part of the trustees, and to the actual construction of the buildings, at a cost of two million and fifty thousand dollars, on the seventh of May the great Johns Hopkins Hospital of Baltimore, was finally opened to the public, with appropriate ceremonies, in the presence of a large number of distinguished medical men and scientists, representing various parts of the country, and declared by the Governor of the State to be ready, in its minutest detail, to begin the good work as originally intended by its founder, and for which so much time, thought, labor and money had been expended. We say "great," for this such an institution certainly is, but we most decidedly avoid the use of such unadvised superlatives as the "greatest" — "biggest" — "grandest" — hospital in the world, which we have frequently met in descriptions by enthusiastic reporters.

The Johns Hopkins Hospital is emphatically *not* the largest hospital in the world by any means, either as to the extent of its grounds and buildings, or the capacity of its accommodations; there are several in Europe that excel it in these points. What, however, it may justly claim to be, is the successful development of a scheme of arrangement and construction according to what both experience and science have, up to this date, taught to be the best methods, and on the large scale, and with the practically unlimited resources, rendered possible by its exceptionally liberal endowment. The result is a hospital, which, regarded from all points-of-view, is probably more nearly perfect for its purposes than any heretofore existing, but which, with the rapid march of scientific discovery, and the growing philanthropical tendency to making large endowments and bequests, may not, after the next decade, be able to claim even that preëminence. Standing as it does to-day, however, it is unquestionably one of the most important and valuable factors in the progress of a large city, and an institution that is destined to exert a broad influence in its own line, and to be conspicuously known throughout this country, and even in Europe.

Mr. Hopkins died in 1873, leaving of his immense wealth three millions and his extensive country seat to establish the University, and three millions four hundred thousands for the erection and endowment of the Hospital. In both cases it was his intention that only the interest of the fund should be used in the construction of buildings; this has been adhered to, the principal of the endowment fund has been increased by skilful handling, and now amounts to over three millions and a half.

As part of a great medical school, the Hospital will always be intimately connected with the University, but the two had different starting-points in their architectural development. The University began with professors and students, in one or two old dwelling-houses. The Hospital begins with its scheme of buildings practically completed and will gradually collect its staff and its patients. The different nature of the work of each was probably best provided for by these different lines of procedure. The University, however, has, in the last thirteen years, gradually raised unto itself various important and costly buildings, but which although doubtless admirably suited to the respective scientific purposes for which they are each designed, are so totally devoid of any special architectural interest in themselves, or any apparent suggestion of a general scheme of arrangement — scattered as they are, at hap-hazard through several blocks of the city — that it now looks very much as if there would never be any really dignified or monumental architecture worthy of the University to call forth any criticism whatever, a result greatly to be regretted, and one that hardly seems an absolute necessity, even while most carefully adhering to the conditions of the endowment, and avoiding the catastrophes too often attending a reckless expenditure upon architecture.

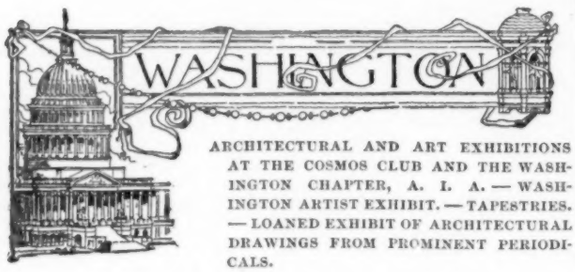
All the trustees were personal friends of the founder, and although he left their actions, as to details, quite free and untrammelled, he expressed to them clearly, both by word and letter, what his general intentions were. He wished to found a hospital, in his own words, "for the indigent sick of this city and its environs, without regard to sex, age or color, who may require surgical or medical treatment, and who can be received into it without peril to other inmates, and the poor of this city and State of all races who are stricken down by any casualty — without charge and for such periods of time as you may prescribe; to also provide for patients who are able to make compensation for the room and attention that they may require. . . to establish a training-school for nurses, and to provide for a site and buildings, of such description and at such distance from the city as your judgment shall approve, for the reception of convalescent patients; to secure the services of the hospital surgeons and physicians of the highest character and greatest skill. It is my especial request that the influences of religion be felt and impressed upon the whole management, but that the administration of the charity be undisturbed by sectarian influence, discipline or control . . . that the institution shall ultimately form a part of the Medical School of the University" — and he directed the trustees — "to obtain the advice and assistance of those at home and abroad who have achieved the greatest success in the construction and management of hospitals."

Thus instructed, the building-committee conferred with five distinguished physicians from different parts of the country, who had made hospitals a special study. They all contributed elaborate and able illustrated essays on the subject, which were published in a large volume, to be a sort of general guide for further action. Of these five men, one, Dr. John S. Billings, of the United States Army, was chosen medical adviser to the Board, and he began his work by first visiting and studying the best hospitals in this country and in Europe. Mr. John R. Niernsée, of Baltimore, since deceased, was selected as the architect to superintend the arrangement and construction, and, later on, Messrs. Cabot & Chandler, of Boston, to design the façades and such other architectural ornamentation as appears in the buildings. A remarkably fine site was secured, covering fourteen acres, the area of four city blocks, bounded by Broadway and three other wide streets, with a frontage of 709 feet and a depth ot 856 feet. This is one of the most elevated positions in the city, having a grand view over the city itself, the harbor and the Chesapeake Bay. The level of the ward-room floors is one hundred and twenty-four feet, and the dome three hundred feet above tide-water. Every most minute detail of the scheme was carefully reconsidered and revised before the arrangement, as it now appears, was finally adopted. Only by reference to the ground-plan diagram of the whole scheme can one obtain an adequate conception of the arrangement of the buildings and of such important points of their details as are there shown. No verbal description alone would suffice. A few of the prominent features may be referred to, however, that are of unusual interest. By way of statistics, there are in the building over twenty million bricks and thirty thousand barrels of cement, over three million feet of lumber, nearly five million pounds of wrought and cast iron, fifty pneumatic clocks, working together, and twenty telephones. There are six miles of underground drain-pipes and fifty miles of piping of all kinds. These pipes are all exposed in a great tunnel branching in various directions. The entire building is heated by a hot-water system, the largest pipes for which are twenty-six inches in diameter, wrapped in an inch thickness of felt, and supported on rollers, to allow for expansion and contraction. The provisions for ventilation and regulating the temperature, varying in different parts of the institution, are most complex and yet complete. The wards are on the "one-story" plan, with basements below and attics above; only one ward in each building, and the buildings are all connected by a corridor running around three sides of the great quadrangle, with the lawn, shrubbery and flowers in the centre. The materials used in the construction of all the buildings are Baltimore red brick, terra-cotta, Cheat River bluestone and slate roofs, with a certain amount of copper, galvanized-iron, *et cetera*.

To attempt a description of all the extensive, elaborate and minute scientific arrangements and appliances adapted to promote the highest degree of hygienic welfare in the hospital would be presuming in an architectural article, and an assumption of what is rightly the prerogative of the very men who conceived, designed and carried them out, and with their integrity, their unlimited resources and ample time, we may happily assume that in these important points the hospital is as nearly perfect as it can be made. When, however, we regard it as an architectural monument, looking at what has been done in the way of architectural design — and this is by no means little or inconspicuous, both in the mass and in the detail — it is much to be regretted that we cannot make the same unqualified statement. A most undeniable attempt has been made in the prominent portion of the group of buildings at both exterior and interior decoration, and where in all other points the aim has boldly been asserted to be to attain as nearly as possible perfection, the failure to do so in this respect is the more conspicuous. Architectural success in buildings of this nature largely depends upon *mass, simplicity* and *character* — things not easy to attain, but the result, when accomplished, is one of the most successful. These characteristics are not suggested in the architecture of the Hopkins Hospital; the effect produced is not impressive, and, recognizing the possibilities and the attempt, the result is almost frivolous. Nevertheless, the public is repeatedly called upon to admire even its smallest detail of design and ornament. Of a few of these minor points the criticism is very simple. The terra-cotta panels and moulding, and the pilasters, etc., of the façade, have no special merit in either design or application; without these attributes they were far better omitted. The construction of the interior of the dome containing the main stairway is of iron, with commonplace ornaments, more suited to stone or plaster, while the surface of the iron is treated with some roughened white preparation imitating plaster, and even the lower portion "grained" to repeat the oak wainscoting of the other side of the corridor. On the ceilings of the principal rooms of the administration building we notice the most commonplace plaster "centres" to be found in the "stock" collections, and in the lesser rooms excessively ordinary marble mantels, all of the same stock pattern. The wooden mantels and brass chandeliers of the larger rooms are pretentiously large and ornate, but of no individual

merit. Some of the furniture of these rooms is massive and expensive, while in one of them we find what we are told is the old library furniture of Mr. Hopkins — a laudable bit of sentiment, perhaps pardonable on the plea of association, although in this case the association suggested to the eye is that of the cabinet-makers' shop of the worst period.

We do not hesitate to dwell thus on these points, as they are details which, in the best work — certainly in France and England, and, indeed, in America — and particularly in a building of this character and importance, the architect would not fail to give his most careful attention, and often with the happiest results. Whether, in this case, the fault lay with the building-committee or not, perhaps the architects can best tell.



ARCHITECTURAL AND ART EXHIBITIONS AT THE COSMOS CLUB AND THE WASHINGTON CHAPTER, A. I. A. — WASHINGTON ARTIST EXHIBIT. — TAPESTRIES. — LOANED EXHIBIT OF ARCHITECTURAL DRAWINGS FROM PROMINENT PERIODICALS.

SINCE moving into their new room on F Street, the Washington Chapter, A. I. A., has held exhibitions at their regular monthly meetings of artistic or constructive interest to the members of the profession. The first exhibit was a unique collection of colored photographs, loaned by Mr. Robert Bigelow, of Japanese temples, altars, screens, gates and dwellings, some two hundred in number. They showed clearly the wonderful skill attained by this Oriental race in metal and porcelain work, as well as the pleasing effect produced by their surface-decoration, the picturesqueness of many of their small buildings and the grotesquesness of their idols and images.

The next was an exhibition of photogravures, from Appleton's "*Artistic Country Homes*," loaned by Mr. Robert Stead, which gave a good idea of the good and bad work which has been done by the profession in this country in recent years.

The walls of the Chapter-room were covered from floor to ceiling, at the third exhibition, by the working-drawings of the United States Soldiers' Home, plans, elevations, sections, scale and full-size details, loaned by Mr. W. M. Poindexter, the architect. Working-drawings are usually withheld from architectural exhibitions, and such exhibitions are made less interesting thereby. It is only in such drawings that we can see the actual working-methods of the architect, unclothed, as it were, by the dressy finish usually given to drawings made for show, and it is only from such drawings that methods of construction and detail can be properly studied. The building shown was interesting both artistically and constructively.

At one of the meetings Mr. Adolf Cluss read a paper on "Renaissance Architecture," the paper being illustrated by some fine copper-plate engravings. The rare ones by Piranesi being particularly good from the engraver's standpoint.

The exhibition given by the Chapter preceding its summer intermission was particularly interesting. The prominent periodicals were requested to loan the Chapter for the purpose of exhibiting, the drawings from which architectural illustrations in their papers had been reproduced. Such a large number were promised that it was determined to hold the exhibition in the assembly-room of the Cosmos Club, which had been kindly tendered the Chapter for the purpose, the exhibition being open to friends of the Club and Chapter. The *Century* loan consisted of about one hundred drawings, all of which were good examples of pen-and-ink or wash renderings, except the Greek Fraternity Building, which were inferior in design and draughtsmanship. The pen-and-ink interior and exterior sketches of English cathedrals, stood preëminently as the best drawings in this collection, and from their elaboration they were the most striking architecturally and artistically. The drawings by Bruner, Fenn, Stanford White, Emerson and others well-known to the artistic world were good examples of their methods of rendering.

Harper's Magazine loaned a set of drawings, showing Richardson's design for the Albany Cathedral, so well-known from its publication in different periodicals. From the size of the perspective and elevations the visitors were enabled much more fully to appreciate the dignity, repose and yet richness of this structure, which, for every reason, should have been accepted, instead of the design which is now being executed in Albany. This building, which our country has lost the credit of having erected, will probably never be equalled, as as we have no Richardson to design the Cathedral of St. John the Divine.

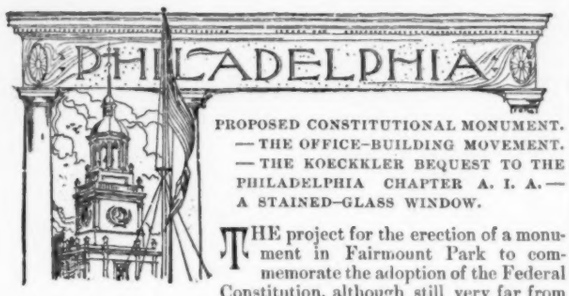
The *Engineering News and Building Record* sent fifty very charming sketches of business houses, residences and other current works. The selection for illustrations in this journal is remarkably good, showing some of the profession's best work, and the drawings of E. J. Meeker, Henry Neu and MacReady, show great skill, clearness and an aptitude in emphasizing the proper architectural features of the buildings depicted, well-worthy of study by all students and draughtsmen. There were several sketches in this collection of old colonial houses, from the pen of Mr. Frank E. Wallis, interesting from an architectural and historical standpoint, but lacking in draughtsmanship, because they seemed to be carelessly and coarsely drawn. *Building* was represented by fifty or more drawings which were in the majority of instances drawn stiffly, and in a more mechanical and less artistic manner than the sketches loaned by the other periodicals.

The *American Architect*, *Inland Architect* and *Building Budget* were not represented on their own behalf, the drawings which they publish being almost invariably returned to the contributors. But the first-named journal was well represented by about one hundred drawings loaned by three of its contributors, S. W. Mead, C. H. Blackall, Shepley, Rutan & Coolidge. The pencil sketches loaned by S. W. Mead were clear, delicate, sharp, showing crisply the desired outline, clearly indicating the form and character of the ornamentation, neither too much nor too little — the general verdict was that these pencil sketches were the most interesting in any collection at the exhibition. Of course, all such sketches lose their delicacy when reproduced by printers' ink or in any other method, so they were a treat which all enjoyed. The pen-sketches by C. H. Blackall were also charming bits of work second only to Mead's, in that they had a certain amount of hardness due to the difference between pen-and-ink and pencil work. The drawings submitted by these contributors attracted the notice and favorable comment of all the architects, and of the artists, of whom there are many in the club, as they were especially attracted by them. Mr. Mead also furnished quite a number of water-color sketches: a Venetian house, a bit of Moorish work and the tower of the Cathedral of Salamanca; they were all pleasant bits of color-sketching. There was a drawing of Trinity Church, Boston, in the *Century* collection, and by comparison it could be clearly seen that Richardson's tower was an evolution of the Salamanca one, and its improvement over the original in mass and detail, shows the proper and legitimate use to which genius has put ancient examples from and in all ages. Shepley, Rutan & Coolidge sent a fine lithograph of the Leland Stanford, Jr., University, in Palo Alto, Cal. This was the only picture on exhibition which was not an original. The method shown in the treatment of the University was quite original, the buildings being nearly all one-story high; in the centre of the group there was a large tower evidently modelled from Richardson's design for the Albany Cathedral.

The Cosmos Club has held several exhibitions in their assembly-rooms more or less interesting to the architectural profession. The walls of the club-room were covered with tapestries loaned by Mr. Fouke, an enthusiastic collector of this costly and beautiful wall-covering. The tapestries were all dated between 1600 and 1700, many were more or less faded and worn, — several pieces had been used for rugs and carpets before they came into the collector's hand. The owner read a paper explaining the different methods of making tapestries, and the difference between tapestries and embroideries, the first being woven in with the cloth, the latter being embroidered on the cloth after it was woven. The celebrated so-called Bayeux tapestries are really pieces of embroidery. Viewing the walls of a room covered with these tapestries, it is easy to appreciate their quiet effectiveness as a wall-covering in large apartments. Mr. Fouke also loaned for exhibition a collection of pastels and oils by Dvarok, a Polish artist, I believe. The pastels were pleasing, but the drawing in the oil figures was a little stiff and strained, while the flesh tints were unpleasantly pale. The most important exhibition given by the Cosmos Club during the year was the one held by the local artists. Washington is fast becoming a popular place for artists, as well as scientists and literateurs. The large majority of the pieces were of course mediocre. The two which I liked best were sheep pieces, by R. Le Grand Johnson, the attitude, grouping and expression of the sheep being natural and effective. The most pleasing landscapes were two or three by Max Weyl. The water-color portion of the exhibition was better than the oil, in that there were a larger number of good pieces hung on the wall. The small landscapes of De Lancy Gill, Victor Mindeleff and the small figure pieces by W. H. Holmes were particularly attractive.

The architectural portion of the exhibition was conspicuous by its smallness. The largest piece was the florid Gothic design made by Smithmeyer & Peltz for the new Congressional Library — not the design adopted. A good water-color of a private residence, Robert Stead, architect. A fairly-made pen-and-ink drawing of the Bank of Washington, J. G. Hill, architect. Several small colored sketches by Hornblowner & Marshall and by Bruce Gray. A rather coarsely rendered but effective drawing for a municipal building by Willis Polk, complete the list. Our architects have done some good work here in recent years, but their drawings, I suppose, have not been finished to the point which they consider suitable for exhibition.

A New Way to settle Strikes. — A strike among the employés of a factory here in Ohio was brought to a successful termination by the proprietor, who increased the wages of all the men working for him who were married, and notified all the single men that at the end of the month, unless they got married, they would be discharged, and if they became married men, he would raise their wages and retain them in his employ. This is certainly a singular way of doing business. — *The Artisan.*



PROPOSED CONSTITUTIONAL MONUMENT. — THE OFFICE-BUILDING MOVEMENT. — THE KOECKKLER BEQUEST TO THE PHILADELPHIA CHAPTER A. I. A. — A STAINED-GLASS WINDOW.

THE project for the erection of a monument in Fairmount Park to commemorate the adoption of the Federal Constitution, although still very far from completion, bids fair to succeed through the untiring energy of the men who are at the bottom of the movement. A year ago last September, during the bicentennial celebration of the adoption of the Constitution, there were present the governors of most of the thirteen original States. The idea of such a monument was then suggested to them for the first time. They considered it favorably, and agreed to meet here again on the Fourth of July of this year to take steps in the matter. Eight of the governors met accordingly, and decided to send a memorial to Congress asking for an appropriation of a quarter of a million dollars. A committee was instructed to prepare a bill for this purpose, to be reported next January, when another meeting will be held. All this seems a tiresomely slow way of going about the affair, but the committee agree in thinking that the money will be granted. Supposing it to be forthcoming, and everything going smoothly, there will be more necessity than ever of "going slow." It has not yet been decided whether the memorial shall take the form of an arch, a column or a building. And when this question shall have been settled there arises the great problem — the choice of a design. If Philadelphia is to solve this problem in anything like so fortunate a way as New York has the Washington memorial arch matter, it will be well for people who take a pride in their city, or who prefer that its monuments should be ornaments, rather than eye-sores, to see to it that the preliminary arrangements are being made in the most careful way possible, for it continually happens that work of this character is put into the hands of some incompetent person, or, at least, of one who does not rank with the first designers of the country. Badly-managed competitions are probably as fruitful a source as any of the execrable designs for monumental work that all of us know so well, and the evil extends, in a less degree, to buildings. It is true that competitions have lately been conducted in the most admirable way in many cases, and we have already in Philadelphia some invaluable precedents in this matter, which are often referred to as guides by companies, etc., about to ask for competitive plans. But in many places the old method still shows signs of life. The other day, for instance, Mr. Windrim received a letter postmarked Salt Lake City, and addressed with admirable simplicity, "Leading Architect, Philadelphia, Penn." It proved to be from the Board of Commissioners on Capitol Grounds, and begins: "Dear Sir,— We offer the sum of $500 for the best plan of a Capitol Building for this Territory, to cost not exceeding $3,000,000," etc. It is needless to quote further. When one considers that the architect making the successful plan would be out of pocket by the operation, it does not seem likely that this system will bring the men whose time is the most valuable to the front.

The common opinion that the "office-building craze" has been overdone has just received another shock by the decision of Messrs. Brown Brothers & Company to make an addition to their new building at Fourth and Chestnut Streets larger, even, than the present one. Mr. T. P. Chandler, Jr., the architect of this very graceful building, is at work on the sketches for the addition. The problem is made more interesting than otherwise — and it is to be doubted if the building will lose anything in beauty by it — from the fact that, owing to the new law widening Chestnut Street, the addition must recede three feet from the old building-line. Of two other buildings by the same architect, that for the Commercial Union is nearing completion, and the Penn Mutual's is just begun. And yet Mr. Chandler, with these and a vast amount of other work on hand, has decided to try a new experiment, which, it appears, is working to complete satisfaction. He has taken a cottage at Atlantic City, and moved his office into it for the summer. The city office is kept open, meanwhile, with a very small force in it, and is connected by telephone with the headquarters at the seashore.

By the will of the late Mr. Koeckkler, whose death occurred last week, the American Institute of Architects inherits a very considerable sum of money. Mr. Koeckkler had travelled a good deal in the course of his studies, and was taught the practice of architecture in Mr. Walters's office, where he had a responsible part in the design of Girard College, a building that puts to shame most of the Classical designs that have been attempted since. He was nearly seventy years old at the time of his death, and had long since retired from active practice. As an Associate Member of the Institute, however, he had always kept up the liveliest interest in that body, and is found to have left all his fortune — with a trifling reservation — to its use.

There is now at the rooms of the Centuries Stained-Glass Company on Eleventh Street a window that for many reasons is well worthy a visit. It was designed by Mr. H. T. Cariss for a church in New York. The window is a memorial one, suggesting a scene from "*The Pilgrim's Progress.*" The composition is very simple. An angel standing with outstretched arm by the side of a rocky path points out to an inquiring pilgrim on her right the way he is to follow. The dark-brown trunk of a willow slants across the background of the picture from left to right. A circular-topped border in browns, and an unobtrusive design at the bottom in blue and brown complete the picture. The window is double-glazed, with an air-space of about two inches. This accomplishes many things that are often hard to find even in good, single-thick, stained-glass. It gives an amazing effect of depth and clearness to the sky, of which the inside layer is clear, crinkled glass, and the outside of the new sort known as semi-opalescent, slightly tinged with blue in places. It gives a richness obtainable in no other way to the color of tree and rock and gown, and, more important still, helps to bring everything into tone. It is very interesting to notice the use that Mr. Cariss has made of the latest experiments in colored glass, especially in representing the texture of stuffs. Whereas there is no painting whatever except on the hands, feet and faces of the figures, and a few black lines of the thickness of the lead-lines (which last are managed, by the way, with the greatest skill and judgment), the coarse fabric of the pilgrim's cloak has all the effect of elaborately stippled work, with none of its opacity; and the gown of the angel, cut out of a marvellously rich brown glass with an even surface, but of varying depth of color, looks, but for its superior brilliancy, like an elaborately painted brocade pattern.

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE AT WASHINGTON, D. C. MR. JAMES G. HILL, ARCHITECT, WASHINGTON, D. C.

[Gelatine Print, issued only with the Imperial Edition.]

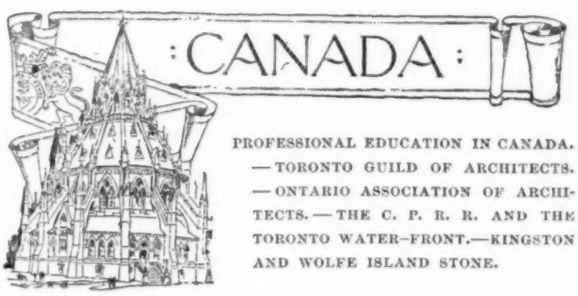
THE JOHNS HOPKINS HOSPITAL, BALTIMORE, MD. MESSRS. J. NIERNSÉE, BALTIMORE, MD., AND CABOT & CHANDLER, BOSTON, MASS., ARCHITECTS.

SEE letter from "Baltimore," elsewhere in this issue.

HOUSE OF G. W. MARSH, ESQ., BRIDGEPORT, CONN. MR. J. W. NORTHROP, ARCHITECT, BRIDGEPORT, CONN.

COMPETITIVE DESIGN FOR THE AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

HOUSE FOR MISS BEARDSLEY, PLYMOUTH, MASS. MR. WILLIS POLK, ARCHITECT, NEW YORK, N. Y.



PROFESSIONAL EDUCATION IN CANADA. — TORONTO GUILD OF ARCHITECTS. — ONTARIO ASSOCIATION OF ARCHITECTS. — THE C. P. R. R. AND THE TORONTO WATER-FRONT.—KINGSTON AND WOLFE ISLAND STONE.

STUDENTS of architecture on this vast continent of America, and perhaps more especially in Canada, are in a very awkward position, resembling in a particular manner the Children of Israel who were told to make bricks, but no straw was given them to make them out of, or, according to the New Testament, resembling the person told to be warmed and fed, while the wherewithal was not given him. A youth is told by his parent to "learn architecture," but where is he to learn it? "To learn to be an architect" is another expression one often meets with; that, perhaps, is the more practical advice nowadays. One *can* "learn to be an architect," but as there are several species of the same *genus*, the

youth can pick and choose as to which kind of architect he will learn to be. In Canada, we have great disadvantages to contend against in the practice of the art. An old-world country has been built up century after century, its builders and its artists have left the monuments of their genius to mark the progress of art, and the student of architecture has but to look around him for examples. America, though a new nation, *is* a nation in itself, capable of developing its national characteristics, its own art and its own science, but a colony of an old-world country is a people who possess, instinctively, all the national characteristics of the mother country, but who are thrown on their beam-ends to live, to develop art and science for themselves without examples to instruct them, without, so far as art is concerned, the "straw" to do the work with. Naturally, their examples are sought from the nearest country, but those seeking them are ignorant of what is good or bad, and students are to "learn architecture" from such a standpoint or starting-point as this. It is very deplorable, but, if you look round for a student, you find, instead, a very peculiar creature, who believes he is a student, but cannot say exactly what he is a student of. He "is studying architecture"—very good, but where are the objects of study? The answer is, "every house, church, shop, bank, etc., in every street that ever was built in such and such a particular town." A wide and varied field for study certainly, but it is sickening to think that those who would be the practicers of an art as old as the hills should know nothing more about it than they can gather from every jerry building put up from designs emanating from the brain of a totally uneducated person. Of course, there are good, clever designs and well-built buildings, but, as a rule, the students of one office will be very critical over the work that comes out of another office, and however good the work may be, or beautiful the design, they, without having some one to point out its good parts, will fail to profit by it. The system of education is all wrong, in fact there is hardly any system at all. A youth goes to an office for what salary he can get, and as soon as you begin to take an interest in him and his progress, which you have as "boss" brought about, you find he wants to go to another office where he could get a little higher pay, or, perhaps, has an opportunity of bettering himself, as he thinks, by going into some clerkship or other. Sometimes it is possible to bind a youth, by making him pay a premium at the outset, but the premium that can be obtained is so small that, except because it prevents the pupil throwing up the work, it is not of much service. It is customary with some to use it by way of bonus to the pupil as he progresses, which is probably the best way, for every one knows that a pupil is not much use as a clerk till the end of his first year, at any rate, but, fifty dollars a year for four years, is not enough to give much encouragement to the student. Undoubtedly, it is hard on the youth, who sees other fellows all earning a salary and helping themselves and their parents to live, and he feels acutely that though sixteen to twenty years of age he is still drawing from the family funds, and being, perhaps, a drag on his father's purse, while all his companions are comparatively independent. The usual custom is to pay a youth a progressive salary and then he "learns architecture," or "learns to be an architect" as well as he can. How is one to distinguish between architects and "architects," what term would adequately express the difference? One is a genius, the other but a jobber or trafficker in the profession. Let us call them "jobbing architects," then. Well, a jobbing architect does not care "a little d—" about his clerks' or pupils' progress, and if one of them wants to leave his office, he can at any moment replace him, and perhaps benefit himself by the change, by drawing a clerk from an architect's office who will be able to bring with him a few "pointers." But, to the architect, it is a very serious matter. He does not so much care about the premium, but he wants a youth to train who will be of the greatest possible use to him, and as a trustee for his education as he virtually becomes, wishes to do his best for him, and help him to do the best he can for himself. But the architect has not time to teach him from the beginning, he ought to be able to get, at any rate, the rudiments of the profession taught him elsewhere, and this has at last become such a pressing necessity that steps are being taken to bring it about. There are "students" in Canada who have been in and about architects' offices for four, five and six years, and yet, at the end of that time, they are but draughtsmen—looking upon the study of architecture as pleasant if they could spare the time to it, but by no means necessary to them as architects, and it has never been pointed out to them that it is necessary. It is very certain that no architect has any more right to take a "pupil" who cannot find means to instruct him than he has to obtain money under false pretences, for it comes to that if there is a premium, and, at any rate, it is obtaining a youth's service under false pretences,—and yet it is constantly done.

The splendid college arrangements of the United States for the education of students are needed in every country, but they are such an advance upon the old state of things that it must be long before a young colony can attempt anything on so definite and great a scale.

But our want of a system in Canada is worse than the old arrangement of older countries. Some of us have had our professional educations in England, and we may be very thankful for it, but how did we get it. In London, long hours, dismal, dreary offices, bullied by head-clerks and driven to ventilating our grievances in the columns of the *Building News*—that is one way—or part of the way. Another part is without so many disadvantages: determined to progress, we put up with inconveniences and have the advantages of glorious examples of art and construction, access to splendid libraries, membership of associations for mutual instruction after office-hours, occasional trips into the country where opportunities occur for the study of various branches of professional interest, but we have to pay for all this by premiums, varying anywhere between £100 sterling to £1,000, according to the professional status of the "principal," and out of our own pockets for everything outside the office.

The various associations, guilds and societies that are springing up in the different towns of Canada, all have in view, however indefinitely at present, the improvement of professional education: improved mutual understanding between the various firms, engenders more genial feelings among students; as the principals join in friendly intercourse so will the students, and as the seniors' societies become established and the benefit accrues to members and the profession generally, it is to be hoped the students will endeavor to form associations under the advice and supervision of their seniors, and waste no further time in the futile attempt to perfect themselves individually without mutual coöperation. Then, indeed, and then only, will it be possible for us to talk about "standards." Out of such associating will grow the strength of the profession, and we may ultimately see a school of architecture which, under present circumstances, it would be useless to inaugurate. Our "students" in Canada are like "sheep without a shepherd"; in Montreal there is no attempt at mutual improvement, in Halifax, Ottawa and Hamilton they appear to be asleep, while in Toronto, though half-awake, they work by fits and starts, as if suffering from nightmare. But, like "Mrs. Dombey," if they would "only make an effort" there is no end of good they might do themselves.

The Architectural Guild of Toronto, originally an informal social association of practising architects, has recently framed and passed a code of by-laws. Its membership numbers from twenty-five to thirty, and by-laws have been found necessary for its guidance. The summer monthly meetings are held out of town at various places, where the members transact the business, see anything of interest there may be in the neighborhood and get a half-holiday.

The Committee of the Ontario Association of Architects has held its semi-annual committee-meeting to arrange a programme for the annual meeting to take place in November next, in Toronto. It is proposed to hold a two days' session, and papers will be read by members on various subjects of general interest to the profession. But at this season, the notion of sitting in a crowded room listening to essays is rather appalling, one prefers to sit without one's coat in the cool shade, if it can be found, and one has quite enough of one's office this hot weather to make one anxious to get out of town as soon as possible, without thinking of "papers."

The Canadian Pacific Railway has all Toronto in arms against it at present, in reference to the proposal of the company to expropriate, by the power of its charter, a very large portion of the water-front of the city, in addition to that already granted to it, subject to satisfactory arrangements as to compensation to be paid to the city. The water-front of the city has been fearfully muddled, the Grand Trunk Railway cutting it off from the city. There are no bridges, and the hundreds of people who have to reach the wharves and steamboats, either for business or pleasure, do so daily at the risk of serious accidents, by level-crossings, without any barrier or watchman to warn them of coming trains. Even to reach the principal entrance of the Grand Trunk station itself, one has to cross the main lines of the railway, but at this point there is a barrier, lowered when a train is about to pass. When this railway company came to Toronto first, some thirty years ago, no one seems to have had any notion that to allow it to separate the city from the water entirely was a very foolish proceeding, and now that the Canadian Pacific wants to run along-side the Grand Trunk and add to the lines to be crossed, the inhabitants are crying "stop!"

Experiments have been made upon the comparative strengths of Kingston and Wolfe Island limestones. The Kingston is a very hard stone, but nothing in comparison with the other. The usual two-inch cubes were used, the Kingston stone fracturing under a weight of 5,000 pounds, while the Wolfe Island withstood the pressure up to 41,000, fracturing then, but resisting still, until at 50,000 pounds weight it burst and fragments flew from under the weight. While at 14,000 pounds pressure the Kingston stone was ground to powder.

A rather curious case has recently occurred in Montreal, which ought to be a warning to those foolish people who try to save an architect's commission. A firm recently employed a builder to erect a warehouse at a cost of $25,000 for their immediate use. When the building was completed, it was condemned by the inspector, and had to be demolished without delay. Instead, however, of going to law about it and endeavoring to collect damages from the contractor, the firm have come to an amicable arrangement by which the contractor is to rebuild a portion of the structure, at his own expense, the firm doing the rest and smiling at their loss.

A Million Bushels.—We read about a million bushels of wheat, but few people realize what a vast amount it is. But if a million bushels of wheat were loaded on freight cars, 500 bushels to the car, it would fill a train fifteen miles long. If transported by wagons the line of teams would be 142 miles long. And yet we consume and export more than four hundred millions of bushels of wheat annually.—*N. Y. Herald.*

PARIS

THE CERAMIC GALLERY. — THE FURNITURE EXHIBITS.

WE are going to-day to take a turn in the French Industrial Section, commencing at the right of the central gallery, going from the rotunda toward the machinery gallery. It is on this side that I find the most interesting art-industries which have some bond of union with architecture; namely, goldsmith's work, stained-glass and ceramics, tapestry, furniture, bronzes and heating apparatus. We will take our trip a little at random as we may be attracted here or there, and first we are drawn to the ceramics. I have already spoken of the monumental doorway which is the entrance to the ceramic display: on entering this section we find at right and left the exhibits of Messrs. Guerin & Deck, which complete the decorative *ensemble* of this entrance by beautiful vases placed on the balustrade. Among the most beautiful ceramic products exhibited, I will mention because of their architectural treatment, those of Messrs. Lœbnitz, which are particularly well arranged in an elegant portico, signed by P. Sédille, Muller, Parvillée, Guilbert-Martin, and Boulenger. We shall find elsewhere all these names when examining in detail the decorative portions of the two palaces of fine arts and the liberal arts. M. Facchina, besides very fine mosaic pavements, exhibits a beautiful copy of a fresco by Tièpolo, from the Palazzo Labia, Venice. Mosaic-work occupies a very important place in the Exhibition, and we find it shown pretty much everywhere. I have already mentioned the doorway in the gallery, of thirty metres, executed by the State atelier of mosaics at the Gobelins, and the fountain by M. Guilbert-Martin, who in Class 20 also exposes enamels and colored crystals of great beauty. That which characterizes the exhibit of ceramics is the richness which its employment adds to decorative architecture and the frequency of its use in this special way. To-day there are made plaques for the walls and mosaic-work for the floors of a design and color which compare favorably with the beautiful antique faiences, particularly the extremely interesting wall tile-work of Tourmaintrau-Courquin, of Desvres, which we shall admire presently at the Algerian palace, where we can examine them as a whole and in grand surfaces.

In the way of mosaics we have those of M. Zambon, and those in marble by Messrs. Burke & Co., and amongst the interesting pavements the mosaic-work in *grès césame* laid in Portland cement, by M. Simons. Also, there should be mentioned the pavements of Messrs. Piquot, Colle et Fils, Boulenger, and the exhibits of MM. Gustave Roy, Raffin, and Ameuille, and especially those by Boch, of the works at Maubeuge. The architectural ceramic decorations in enamelled lava by MM. Gillet and Lefort, of Ylouses, are very curious and possess great richness, and the faiences of M. Farque have much beauty of color and are extremely brilliant.

In the line of things less particularly architectural, but which, nevertheless, are connected with it through decorative interests, there should be mentioned the beautiful ceramics in Palissy ware of MM. Pull, father and son, who exhibit as their chief piece a reproduction of a part of the chimneypiece of Germain Pilon in the Salle de la Renaissance at the Louvre, and also the faience of M. Gallé, of Nancy, whom I have already mentioned when speaking of the pavilion in the grand gallery of sculptured wood and marquetry, whose decoration is inspired from paleontological flowers.

There may be seen in the exhibit of M. Gallé in the ceramic class a curious perforated partition of amaranth wood and lake oak, very elegant in form and containing a most noticeable artistic note.

The art pottery of the Gulf Juan exhibited by Clement Mossier, has much richness. We remark particularly two faience wall-panels which have a metallic lustre in the Persian style, which are truly magnificent; but the difficulty of the execution which prevents one's ever foreseeing the results renders the price of this product excessively dear and consequently prevents its having any practical utility.

It is necessary to examine everything in this magnificent class, which includes also the faience work from Creil, Montereau, Limoges, Blois, Nevers, etc., and which prove how our times will occupy a glorious place in the general history of faience and ceramic work, and what grand and fair part will be that of France the progress of the Exhibition makes clear.

Class 20, which we have just passed through hurriedly, connects with Class 17, furniture. The eye is at once attracted by the Renaissance stairway which occupies the centre of the space and gives access to a saloon which overlooks the whole gallery. It is the exhibit of the Maison Damon, and is a very beautiful example of luxurious furnishing. This construction, for it is really one, was composed by M. Gambier, architect. The staircase, in three runs with two landings, is decorated with elegant balustrades, and at the bottom are two female figures. The saloon opens on the last landing through a great arch decorated with sculpture, on each side of which is found a bay composed of two smaller arches with a column like a mullion between, and pierced above with a circular opening, in which is seated a draped female figure. This beautiful composition in oak wood and mahogany forms a very beautiful combination, and would make a very rich feature at the end of a gallery of assembly, for instance. The figures, in solid mahogany, were executed after models by M. G. Deloye. This exhibit, the most important of all, has the stamp of modernness in an interesting way, and makes a contrast with all the copies and imitations of antique styles which we find in most of the furniture exhibited. Originality is too often wanting. The Renaissance, Gothic (Gothic especially), the English style, the Japanese style, are more or less happily copied, but we rarely find a piece of furniture composed without researches into ancient styles or retrospective souvenirs, and consequently rarely really new. This is a blessing, and it is an evil. The evil does not need pointing out at length. It is the absence of progress in the composition of a bit of furniture responding, in the history of furniture, to the epoch in which we live. It is clear that the nineteenth century, which has not more than a dozen years to live, runs a great risk of giving birth to no style which is unquestionably new, and, nevertheless, as an eminent critic of art, Henry Havard, has said, "These restorations have a good side. They have had a singularly fertile influence on the fate of French furniture." In the first place through direct comparison they have allowed the reëstablishment of the perfection of manual work in our time. They attest in fact that in the way of ability and knowledge our artisans have no reason for envying their predecessors. The study necessary for this restoration has also brought about the education of a very army of designers, workers in bronze and ebony, who in applying ancient forms and decorations to new uses will succeed, we will hope, in creating the new style which we all clamor after.

Among the houses which have interesting exhibits, although for the most part deserving the same reproach of copied and tormented compositions, I will mention the houses of Flachat, Cochet of Lyons, Drapier, Zwiener, Raulin, Schneider, Roll, Schmidt, Piollet and Perol, who exhibit well-studied pieces of furniture, among which we find the evidence of a searching after originality, which is sometimes interesting. The Japanese style is very richly represented by M. G. Viardot & Co., whose furniture is particularly elegant and distinguished. It is Japan with a Parisian accent and originality of feeling. The Maisons Bailly, Théroux and Warth, of Tours, also show Japanese furniture well-studied, as well as the Maison Ruffier, of Aimes.

M. Blanqui exhibits a very heavy and massive cabinet, although it was designed by M. Paul Sédille, but quite perfect in point of execution. M. Malard has reproduced in a curious manner a bed-chamber of the thirteenth century, after Viollet-le-Duc. It is original in idea, but the success of the effort is open to discussion. One of the most interesting exhibits in this class is that of M. Gallé, of Nancy, whose work we have already admired in the ceramic gallery. Here at length are pieces of furniture which are artistic, not commonplace, but having a characteristic stamp. Among other things I will mention a great extension-table, of walnut and plum-tree wood. In the centre of the gallery stands a fine pulpit of carved wood executed by MM. Moisseron and André, at Angers, for the church at Beaufort, graceful in style, but perhaps rather too pretty for a church, and wanting the severe religious character which ought to be imprinted on this kind of furniture. Among the makers of furniture of antique model, so sought after by a certain public who believe that they have a stylish piece of furniture when it is overloaded with ornaments, sculpture, leafage, columns, figures of men and animals or fantastic beings, there must be mentioned the houses of Drouard, Hertenstein, Porte-Secretain, Huguet, Brossier, Cruyen, etc. Here and there we find in different exhibits a bit of furniture less tormented and more pure in style, but everything has an appearance of extravagance.

Before leaving the furniture gallery, I wish to say a word of the exhibit of M. Rabinel, ingenieur des Arts et Manufacturers, who shows some ornaments in carved wood, very interesting because of the ease with which they could be used in architecture. Here are found ready-made *motifs* of every kind, mouldings, running ornaments of every style, friezes, panels, screens, mantlepieces, etc., which allows an enormous economy to be made in this kind of work, which is ordinarily so costly. These carvings can also be made after original models, which allows the architect to imprint upon his work his own expression. These products are really very interesting, as they are not hurried over and badly worked. The wood in fact is hard and of good quality and carved and not pressed back. By the process it is possible to obtain a relief of one decimetre or more in the carving.

M. BRINCOURT.

INJURIES DURING THE BUILDING OF THE EXHIBITION BUILDINGS AT PARIS. — No inconsiderable amount of blood has been spilled during the erection of the exhibition on the Champ de Mars. It is calculated that 6,350 men were treated for injuries or for illness resulting from exposure; 300 workmen hurt their legs; 260 received severe injuries in the eyes from projecting timbers or bars of iron; 114 were scalded or severely burned, and fifty had their fingers cut off. The deaths from falls are put down at 24, but it is believed that they were far more numerous. — *Pittsburgh Despatch.*

THE KNIGHTING OF MR. ARTHUR BLOMFIELD.—THE ARCHITECTURAL ASSOCIATION'S ANNUAL PLAY.—ARCHITECTURE AT THE ACADEMY.—EFFECT OF AMERICAN DRAUGHTSMANSHIP.—ROMAN BATHS.—LIMITING THE HEIGHT OF BUILDINGS.—A SCANDAL AFFECTING MR. ROBSON.

AT last the architectural profession in England has received that national recognition that has long been its due. Amongst the birthday honors conferred by the Queen this year was a knighthood for an architect. Mr. Arthur W. Blomfield, A. R. A., was the lucky recipient. He is Vice-President of the Royal Institute of British Architects, and is distinguished for the very satisfactory way in which he utilizes the early Perpendicular style in his work. He was one of the many children of the late Bishop Blomfield, a former occupant of the see of London. He graduated at Cambridge University, and represents, perhaps, what one might term the academical side of architecture. The more direct cause of his knighthood was some new buildings which he has recently erected at Eton College, upon the site of the old Mathematical School there, and the foundation-stone of which was laid by the Queen the other day in the midst of regal pomp and ceremony. I have had the pleasure of visiting these new buildings, and cannot refrain from expressing a feeling of great disappointment at the character of the work. It is far from being one of Sir Arthur Blomfield's best works; indeed, some of it is distinctly poor and devoid of artistic feeling. Still, Sir Arthur is one of the foremost of our English architects, and has deservedly earned the title which is now his, though its bestowal has aroused no little cavilling here, inasmuch as every one expected that when the tardily-awarded honor of knighthood was bestowed upon an architect it would have been given to Mr. Alfred Waterhouse, R. A., President of the Royal Institute of British Architects, and the recognized head of the profession in Great Britain.

Our students here have been recently celebrating the end of "session" by sundry revels. One of the most interesting was the Architectural Association's *soirée*, which is always looked forward to with great interest in the architectural profession. It nearly always takes the form of a topical play or burlesque, hitting off very neatly the various professional events of the year. The play this session was written by a very clever amateur, Mr. Francis Miller, whose writing was only equalled by the splendid manner in which he took the part of the Bishop of Ipecacuanhaland (a curious anachronism, by the way, seeing that at the date the play was laid the race of colonial bishops was *non est*). Most of the parts were taken by students, one of whom did not disdain to don the airy nothings of a *coryphée*, and the whole entertainment was of a very enjoyable nature. Although no one but students and past students were allowed to attend, the audience numbered over six hundred.

The other "great day" was the ladies' concert of the students' musical society, called the Architectural Association Lyric Club. This was a sort of speech-day, and was attended by a very large and fashionable set of people, including the leaders of the profession. The students' works of the session were exhibited in the rooms of the Royal Institute of British Architects, and the collection showed that much excellent work had been done in the class-rooms during the winter.

The Architectural Room at the Royal Academy contains some very excellent and thoughtful work, though there is no very large building exhibited. Mr. Waterhouse's new Hôtel Metropole on the foreshore at Brighton is, perhaps, the most important edifice on exhibition. Talking of the Academy, I have received a very interesting little publication, called "*Academy Architecture*," which is made up by reproductions of all the important drawings in the Academy, as well as a fair sample of those rejected. The plates are very clear, though a trifle small in scale, and the work, altogether, is quite worth the half-dollar which is asked for it. It can be obtained from Messrs. English & Koch, 69 Chancery Lane, W. C.

One of the points which crossed my mind in looking through the drawings at the Academy was the singular influence of the peculiar and undeniably effective style of draughtsmanship that obtains on your side of the Atlantic, whereby broad spaces are left quite white in the drawing, and brilliant contrasts of black-and-white sought for. By this means a bright, pretty drawing is obtained, but one, I am afraid, which conveys far too favorable an idea of the building. This style of drawing has made its appearance in the Academy this year, I think, for the first time, and it is a mooted question what effect its introduction will have upon English architecture.

Another "trick of the trade," which I do not fancy, I have seen in your drawings, that is to merely commence the central lines in a large group of mouldings, and only run those bounding the group round the full length of the arch. Thus a lot of tedious, difficult work is saved ("shirked," the *Builder* calls it) and an excellent effect obtained. This does not seem a bad idea, only it is now carried to excess, and both perpendicular and horizontal lines are treated in the same way, which, I need scarcely say, tends to produce a very scrappy, careless drawing. I just mention these things as thoughts suggested by a cursory look at the drawings and sketches at this year's Academy.

We have had a contest this year for the presidency of the Architectural Association, for the first time in its history. The successful candidate is Mr. Leonard Stokes, one of the most promising architects of the day, and the majority with which he gained the day is a great triumph to those who look upon the artistic as the all-important side of architecture—*primus inter pares*, in fact.

A very interesting lecture was delivered at the Royal Institute of British Architects the other day by Professor Aitchison, A. R. A., upon the Roman Thermæ—those great buildings wherein the luxuriance of Imperial Rome was particularly *en evidence*. His description of the various buildings teemed with interest; indeed, it is a little difficult at first sight to realize the enormous scale upon which these edifices were constructed. For instance, the Baths of Caracalla are supposed to have been as large as our Houses of Parliament in London, and replete with every convenience for bathing, gymnastics and exercise of every description, while nothing was too precious to be impressed into the service of the decorators. The Professor entered into the vexed question of the original purpose of the Pantheon, and inclined to the opinion that this wonderful building was undoubtedly the laconicum of the Thermæ of Agrippa. This view was subsequently repudiated by the Chairman of the Board of Examiners in Architecture, but the bulk of the evidence seems to be on the side of the Professor.

A bill has been lately introduced into Parliament by Mr. Whitmore for the purpose of limiting the height of buildings. The main idea of the bill is that no building is to be higher than the width of the street on which it abuts. The bill has met with a fairly favorable reception, but it remains to be seen whether it will pass the Parliamentary ordeal, or be included in the "massacre of the innocents" at the conclusion of the session.

The site of the defunct Italian exhibition is occupied this year by the wares of Spain and Portugal. From what one hears, the arrangements have not been very satisfactorily carried out, and it remains to be seen whether it will be a success or not. Of course the architecture of the Peninsula is not to be named in the same breath with that of Italy.

An unpleasant episode has occurred with reference to Mr. E. R. Robson, architect to the Education Department. It appears that Mr. Robson, who is supposed to have a unique knowledge of the wants and requirements of elementary schools, is frequently appointed assessor in competitions for schools. It has been noticed that nearly always, when this was the case, Mr. Charles Bell, a well-known city architect, managed to get the competition, and it now transpires that the competition plans were generally drawn for Mr. Bell by Mr. Robson's head-assistant in his spare time. The matter has been brought before the Council of the Royal Institute of British Architects, where it is to be sincerely hoped satisfactory explanations will be given of the matter.

CHIEL.

SAFE BUILDING.[1]—XXX.

VOL. II.—III.

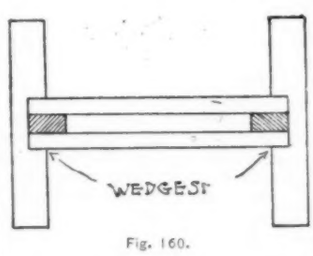


Fig. 160.

System of Piling.

WHEN beams or other rolled-iron shapes are to be rolled the cold muck bars are sheared off to convenient lengths and sufficient of them tied together with wire into bundles to make the desired length of beam or other shape. This is called piling. Usually from five to nine muck bars are piled on top of each other in each bundle.

The details of piling and size of muck bars, of course, vary in different shops.

The Phœnix Iron Company form their pile for beams over nine inches deep very ingeniously, by rolling bars of different shapes, which are keyed and fitted into each other and are driven and held firmly together by wedges, as shown in Figure 160.

The writer believes that there are only a few mills using this method, which is to be regretted, as the advantage of having the grain or joints of the rolled-section longitudinal to each part is very great over the method where the seams run at right angles to the web, as is the case in the ordinary piling.

Rolling out the Piles.

These bundles or piles are put into the fire and heated to an almost white heat. They are then put on barrows or trucks and run as fast as possible to the rolls. These are arranged in pairs or in threes in a long line. The rollers

[1] Continued from page 29, No. 708.

are about eight feet long, the ends supported in cast-iron stanchions (called housings) of tremendous strength, the pressure against them being very great when the iron is forcing its way between two rollers. In "two-high mills" there are two rows of rollers over each other, in "three-high mills" there are three rows of rollers over each other.

Description of Rollers. Each row of rollers revolves in opposite direction to the next row over, the result being that the iron is drawn in and squeezed between them. The roller has cut along its surface grooves which gradually shape the heated mass to its final section. The first set of teeth shape the iron roughly to the shape desired, the next pair come a little nearer to the shape, and so on till the last pair which give it the exact shape; for large sections it sometimes requires two sets of three-high rollers for each piece, but usually one set answers to roughen and finish the piece. Of course the length of the piece increases as its cross-section is diminished by the squeezing process of the rollers. Where the rollers are three-high, the heated bundle or pile is run through the first set of grooves in the lower pair of rollers in one direction; as it comes out on the other side, it is picked up by a pair of tongs (usually manipulated

Process of Rolling. by hand, but by steam when large pieces are being rolled), and carried to the upper pair of rollers, where it runs back through their first pair of grooves but in the opposite direction. It is then carried to the second pair of grooves in the lower rollers where it runs through in the same direction as through the first, then back through the second pair of grooves in the upper rollers and so on to the end. Where the mill is only two high the rolling is all done in the same direction, the iron being run back over the upper roll, its friction on and the turning of the roll facilitating greatly the work of getting it back quickly. The operation of rolling continues during the one heating of the bundle or pile of refined iron, as, of course, the furnaces would not be large enough to re-heat long pieces. The rolling must, therefore, be very rapid, and no delay should take place. The pressure of the rolls is so great that if the mass meets with any obstacle, instead of stopping and wedging in the roll the balance will run on out and curl the piece all up, sometimes even pushing the end up through the roof. When the iron has made its final passage through the rollers and is

Straightening the Pieces. properly shaped in section, it usually is all curled up lengthways in both directions. It is still at a cherry red heat and is, therefore (after having the defective parts at the ends cut off by a circular saw), either run onto or quickly carried by a gang of men and placed lengthwise across a long series of skids or rollers. At the other ends of these skids are iron upright stops. A gang of men armed with heavy wooden mauls or mallets belabor the flat side of the section its entire length till it touches the skids at every point. They now move it over against the stops and belabor the short edge or flat side of flange, till the flat side of the other flange touches the stops at every point. This, of course, straightens the beam or other section lengthwise in both directions. It is now allowed to cool and is ready to sell for use. Plate-iron is straightened as above. Beams and channels are straightened cold by being run through a gag press. Angles are straightened cold by running through straightening rolls.

Single Refined-iron. Iron rolled as above is the ordinary rolled-iron of commerce and is known as merchantable or "single refined-iron."

For better qualities the muck bars are heated and rolled into plates of single refined-iron. When forming the bundle or pile the top and bottom layers consist of the single refined plates, the intermediate layers being muck bars. Or the top, bottom

Extra Refined-iron. and centre layers are of single refined-iron plates, the other layers being muck bars. This is generally known as "extra refined-iron" and a small advance charged over single refined-iron.

For the best work *all* the layers in the pile or bundle are made of

Double Refined-iron. single refined plates, no muck bars at all being used. This is known as "double refined-iron" and a considerable extra price is charged for it over the cost of single refined-iron.

For very important tension-members in trusses or arches, or for important hangers it is very desirable to use the double refined-iron. But, as a rule, the best results will be obtained by being satisfied with whatever kind of iron the mill is accustomed to roll. It stands to reason that a mill will not upset its regular shop practice and line of work for a single order unless well paid for it, so that, as a rule, it is more speedy and more economical to take their regular iron and use a larger size of cross-section. Then, too, where double refined-iron is ordered, the most constant supervision will be needed to get it. The men will probably prefer to relapse into their regular ways even if the principals do not. Then, too, in a report to the Government of a large series of experiments made at many mills and tested at the Watertown Arsenal, it was found that the result of the double refining was harmful at times, and that its value depended entirely upon the nature of the muck bar.

Where the muck bar was of a decidedly poor quality, showed air

Result of Several Rollings. holes, blisters, and a general crystalline appearance on fracture, or spluttered greatly while being run through the rotary squeezer or the steam-hammer, denoting the presence of much slag and impurities, that is, when the quality of the muck bar resembled that of a dirty and poor cast-iron, the double refining was of great service in adding strength to the material. Where, however, the muck bar was of a good quality, the puddle ball spluttering but little in the rotary squeezer or in the steam-hammer, and the muck bar itself showing on fracture a goodly part of fibrous section and the balance with but little impurities, the double refining was found to positively injure and weaken the iron, to dry it up, as it were, leaving the successive layers distinctly visible, when the iron is tested by eating away its edge with muriatic acid, or in circular pieces distinctly showing and opening the successive layers on fracture. This in the case of double refining of poor-quality muck bars was not nearly so marked.

It concludes, therefore, that some impurities help to amalgamate the final layers, and that where the muck bar is already of a partly wrought-iron nature — partly fibrous on fracture — that double refining works an injury. For important work, therefore, there should be a constant mill supervision by an inspector stationed there for that purpose, and the question of double refining or not should be left for decision to tests made on the premises.

Extra refined-iron, however, can safely be used at all times, the only drawback being its additional cost, and the doubts whether it will be furnished as specified unless the work is closely watched and inspected.

Instead of using muck bars to make up the bundles for the final

Use of Old Iron. heating, the mills sometimes use the cut off and otherwise waste ends of beams and other rolled-iron; there is no objection to this if the iron is not too dry, but, as a rule, it is a very good practice, as the iron thus gets an extra rolling or double refining. Nor is there any other objection than above to the use of old rails, beams, or scrap iron, provided always that all such material is free from all rust and is thoroughly cleaned; where mixed with muck bars, and thoroughly cleaned, and perfectly welded, it is greatly to be recommended.

The frequent rolling of English iron within a reasonable limit, according to Sir W. Fairbairn, improves its quality and strength; if, however, it is rolled too often, re-heated more than five times, he says it quickly loses its strength.

Pure iron, that is, iron [*practically*] free from carbon, consists

Effect of Rolling. when heated to a white heat of a mass of crystals of cubical form. The effect of rolling is to elongate these cubical crystals into long silky fibres which interlace and bind themselves together and form the mass of all good wrought-iron. A repeated sudden shock or blow, when cold, or continuous heavy vibrations, tends to restore the fibres to their original form, that is, crystallize them, the iron becoming very brittle and weak. It is for this reason, in testing wrought-iron, that if it shows crystalline specks on fracture, it is considered to be of a poor quality, provided of course the fracture has not been made by sudden blows; if, however, the broken section is entirely fibrous the nature of the wrought-iron is correct and considered good. If wrought-iron contains sulphur it is "red short," or cold short and difficult to roll.

Wrought-iron is usually sold by the yard in length, that is, each

Why sold per yard. section is known by its weight per yard. The reason of this is that the weight in pounds of a section of wrought-iron one yard long is exactly ten times its area of cross-section in square inches. One-tenth of the weight per yard in pounds is then the area of cross-section in square inches.

In the above the writer has purposely used the words "wrought"

Nature of Wrought and Rolled Iron Similar. and "rolled" iron interchangeably. They are really the same thing. Their nature is supposed to be exactly identical. If any distinction can be drawn, it would be that in rolled-iron the elongated fibres are formed by rolling, while in wrought-iron they are formed by hammering, either by hand or machinery.

For large sections, rolling is to be preferred; but for small sections, hammering by hand is generally preferable; this latter is frequently also known as forged-iron. Welding is the process of heating two separate pieces of iron and uniting them together, while hot, by hammering or forging. The fibres of the two parts interlacing and forming a joint nearly as strong as the material. Any iron that can be forged, rolled or welded is called malleable.

There is a quality of iron known as malleable cast-iron, which com-

Malleable Cast-iron. bines the qualities of both wrought and cast iron, being cast-iron of a semi-wrought-iron character, which can be forged. The forging, however, has to be done *cold*, not hot, as with wrought-iron. The process is described as embedding cast-iron in powdered hæmatite ore or in scales of oxide of iron, or other oxides, and raising it to a bright red heat in an annealing oven. Pieces of cast-iron not over one-half inch thick can be made entirely malleable by this process; with thicker pieces, however, it is only possible to render the outside skin malleable to a depth of about one-quarter inch, the depth, of course, depending on the length of treatment, the interior retaining its unaltered cast-iron character.

The manufacture of steel is still in its infancy, and as a result

Manufacture of Steel. great uncertainty attends the results obtained. Nor have the different methods of manufacture been tested sufficiently long to definitely establish the superiority of either.

It is partly for this reason, and also on account of the many different kinds of steel produced — dependent on the varying amount of carbon it contains — that there are so many radically different processes of manufacture.

As already remarked, steel in its chemical composition is the intermediate between wrought and cast iron — wrought-iron being theoretically free from carbon, while cast-iron has ordinarily a good

deal more carbon than steel and *holds it in a different form.* Steel with but little carbon is called "mild steel," with much carbon "hard steel," the former being the more reliable of the two. It should be noted, however, that whereas in the earlier stages of the manufacture of steel its chemical synthesis was made the criterion, yet to-day the oft-mooted question as to whether a certain product is iron or steel is more often determined by reference to its physical characteristics than to its analysis. The physical characteristic of steel is that it may be *cast* into wholly malleable ingots, that is, the *cast* ingot or lump can be rolled or forged in its heated state without any intermediate process. This is not true as regards cast or pig iron which is entirely non-malleable, while, on the other hand, wrought-iron cannot be cast, not being fusible at temperatures obtaining in the arts.

Characteristic of Steel.

The great importance and future of steel lies in the above property as also in its large tensile strength, its great elasticity, its hardness, and its further advantages of being capable of "hardening" and of taking a "temper." It combines within one metal the ductility and weldability of wrought-iron with the hardness and fusibility of cast-iron, and this with an elasticity and tensile strength greater than those of wrought-iron.

Hardening consists in raising the steel to a red heat and suddenly cooling it in water; this greatly hardens steel but does not effect wrought-iron, while cast-iron would fly to pieces under such treatment. Hardened steel can be softened by tempering, this is done by re-heating the hardened steel, but to a *lower* temperature than before, and again cooling it, but slowly, when it will be tempered or softened.

Hardening Steel.

Steel retains magnetism greatly. When struck, steel rings out a sharper metallic sound than iron, but in physical appearance it often resembles wrought-iron to such a degree that even practical iron-masters are not able to distinguish between them by merely looking at their fractured parts. Steel is malleable at a lower heat than wrought-iron, and for this, and other reasons, but principally on account of the danger of "burning" it, — it is usually rolled at a much lower temperature than wrought-iron; being, as a result, much more solid, that is, further from the melting point, than is iron when passing through the rolls, it requires very much greater power and heavier machinery than the latter.

Steel rolled colder than Iron.

The production of steel direct from the ore is perfectly feasible, but has not yet attained to any relative commercial importance, if we except the process recently employed and improved by the Carbon Iron Co., of Pittsburgh, Pa. This company have lately produced steel of extraordinary quality at a comparatively reasonable cost by a process approximately described as puddling a certain kind of iron ore with graphite. It is not likely, however, at this writing, principally on account of the cost of manufacture, that this product will find its use outside of the demand for tool-steel, boiler (flange and fire-box) steel, and such other high grades of necessarily limited consumption as compared with rail or structural steel.

Direct Process.

All the different processes of manufacturing steel really narrow down to the two principal methods of either the addition of a certain percentage of carbon to pure or malleable iron, or the removal of part of the carbon from pig-iron. To give all the variations practised in these two principal methods would be impossible here, but under the first method we can cite the cementation process or the manufacture of the commercial "cast" steel; as an intermediate process the "Open Hearth" processes; and under the second method the well-known "Bessemer" process.

Two Principal Methods.

Of these, in its main features the Cementation process is the oldest. Briefly, bars of wrought-iron are packed in charcoal in air-tight retorts or "pots" and subjected to a white heat for over a week's time. The wrought-iron absorbs the carbon or alloys with it, showing a blistered appearance — whence the name of "blister" steel — and becomes readily fusible.

Cast-steel.

These blister steel bars when piled and rolled once constitute the "single" shear steel of commerce, or if re-piled and re-rolled the "double" shear steel. If, however, they are broken up and melted in a crucible and cast into an ingot which is re-rolled, the quality and uniformity of the product are much improved and it is known as "cast" steel; the principal use of which is for cutlery and edge tools. Cast-steel is the hardest, strongest and densest steel made, but when raised beyond a red heat becomes so brittle that it cannot be forged. It cannot be welded and flies to pieces under a powerful blow.

The *Open Hearth* process may be justly regarded as the intermediate process because it is either the carbonization of or adding of carbon to wrought-iron, or the decarbonization of or removal of carbon from pig-iron, both reactions usually existing in one and the same heat, as in the best known *Siemens-Martin* process, which is a typical and probably one of the best open-hearth methods to-day.

Open Hearth Process.

It consists of melting a combination of irons in a basin-shaped hearth under a reverberatory roof by playing on them what is really a blowpipe with a flame oxidizing (removing carbon) from the mass; or reducing it (adding carbon) at will (but usually oxidizing). The combination consists of pig-iron and wrought scrap-iron or old steel rails, or else of pig-iron and iron ore, or sometimes a combination of all the above; when melted down, the one with or in the other, the mass is stirred about to render the mixture homogeneous, and after preliminary testing of samples, is duly poured into ingot moulds. Thus the cast-iron gives up its excess of carbon to the rest of the charge having less or none, and the resultant product, which can be controlled with a nicety that is surprising, is a steel of high grade, with carbon between limits that are well governed from the start to the close of the conversion. The ingots are allowed to cool and are then sold to mills not owning steel furnaces, who, of course, have to re-heat the ingots before rolling them. Where a mill manufactures its own ingots, however, the hot ingot is run directly to the blooming mill and rolled into "blooms" while still hot.

Condition known by tests.

Louis DeCoppet Berg.

[To be continued.]

BUILDING LAW.

THE EMPLOYERS' LIABILITY ACT.

We have several times called attention to the possibility that this Act has fastened a new liability for accidents on builders employing architects. The Act was intended mainly to cover cases of contractors; but the question is raised whether in view of certain nearly uniform practices among the architects of Boston, it is not broad enough, to make the owner equally liable with the contractor for a large part of the claims arising under it. It is, for instance, customary, though by no means essential to the proper superintendence of a building contract, to give the architect power to control and direct the operations; and the provision that all material delivered on the premises at once becomes the property of the owner is equally common. Where, by the terms of the contract, the architect is to have the direction and control of the works, it would seem a fair argument, at least, that he was a person entrusted "with the duty of seeing that they were in proper condition"; and the Act is thought by some to make the owner liable in such cases for all accidents that take place by reason of any negligence on the part of the architect, which, of course, is a question of fact for the jury.

The provision commonly found in building contracts that all material shall become the property of the owner as soon as delivered on the premises is also dangerous; for, as is well known, the scaffolding and other ways are usually constructed by the contractor out of lumber delivered on the premises. The property in the scaffolding under such a clause is evidently in the owner; and the Employers' Liability Act makes the owner responsible under certain conditions for "defects in the ways, works, machinery or plant if they are his property."

That the suggestion of the dangerous character of these provisions was well-founded is shown by the fact that already two suits have been begun in Boston, in which the claim is made that the accident took place by reason of a defect in a scaffolding made of lumber which was the property of the owner. The Employers' Liability Act is not in full operation quite yet, and thus far comparatively few suits have been brought to take advantage of its provisions. It is significant, therefore, that notwithstanding the small total of such actions now pending in this county, two should be brought against the owner rather than the contractor.

The way to avoid this danger, or, rather, to reduce it to a minimum — for the risk of suits for accidents can never be wholly avoided — is to adopt a practice that had been resorted to by some lawyers even before the passage of the Employers' Liability Act:

1. Give the architect the fullest powers to *reject* any work which appears to him defective; but carefully provide that he shall have no control or direction; that is, draw the contract so that he cannot say how the work shall be done, but if it is not done satisfactorily can order it taken down and done over again. In practice such a provision works in about the same way as the usual clause, giving the architect full powers of direction; the contractor, if he honestly intends to live up to the terms of his contract, will avoid doing what he knows the architect will condemn; and if an accident takes place and litigation arises in which it is sought to prove that the architect gave the directions which led to the accident, the owner will be very thankful that his contract withheld from the architect all authority to give such directions on his behalf.

2. As to the ownership of materials delivered on the premises: instead of providing that these become the property of the owner at once, limit the operation of this clause to materials intended for permanent incorporation into the building, and provide that all scaffolding, apparatus, ways, works, machinery and plant brought upon the premises by the contractor or used by him shall be and remain his property. If it is thought wise to provide that in case of the builder's insolvency the owner shall have the right to use the scaffolding, machinery, etc., that can be accomplished by suitable provisions.

If the plaintiffs in the two cases referred to above should succeed in fastening a liability on the owner by reason of his ownership of the scaffolding, the terrors of house-building will be increased, and the lot of the owner made more unhappy than it proverbially has been in the past.

Pending the decision of these cases, it will certainly be prudent to

alter the customary clauses relating to the architect's control and to property in the materials, in the manner indicated.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

PUBLISHERS AND ARCHITECTS.

PORTLAND, OREGON, July 17, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Recently we sent a local journal the original drawings of a building at their request and at some inconvenience to ourselves and requested them to place our name under the cut of the building or in some way give us credit for the same, they did so, but to our surprise charged us $20.00 for the same, we paid the bill and at the same time made the statement that you never made any charge for cuts or name of architect. In the course of a debate that followed the publisher made the statement that if such was the fact that he would insert our card for ten years in his journal and place our name under every building of ours that he published. We enclose our reply to him and desire you to answer more fully. Trusting that we are not putting you to too great an inconvenience and looking for an early reply we beg leave to remain,

Very respectfully yours, X. & Y.

[*Exhibit "A."*]

PORTLAND, OREGON, July 3, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In case we send you an exceedingly meritorious photograph of one of our late stone residences, would it cost us a cent if you produced the same in one of your photogravure plates? An early reply will greatly oblige,

Yours very respectfully, X. & Y.

[*Exhibit "B."*]

BOSTON, MASS., July 10, 1889.

MESSRS. X. & Y.,
Portland, O.:

Dear Sirs, — In answer to your question of July 3, we will say that contributors of designs accepted for publication in the *American Architect* are subjected to no expense in the matter.

Very truly yours, EDS. AMERICAN ARCHITECT.

Respectfully submitted by X. & Y.

We suppose that you will fulfil your agreement to publish our card for ten years without charge, and place our firm name under all work you publish that comes out of this office free of expense to us, which you stated you would do if the American Architect published fine cuts for nothing.

[*Exhibit "C."*]

PORTLAND, O., July 17, 1889.

TO MESSRS. X. & Y.:

Dear Sirs, — In reply to enclosed, wish to say that I will stand by my original proposition: Whenever I see any of *your* work published in *American Architect* without you having furnished the cut I shall be glad forever after to have your name appear on any building that we publish of which you may be the architect. The very wording of *American Architect* gives the snap (so to say) away. It shows there is a wheel within a wheel. However, I shall publish your name after any of your work has appeared, as I do not go back on what I say. Respectfully, Q. R. S.

[*Exhibit "D."*]

PORTLAND, O., July 17, 1889.

MR. Q. R. S:

Dear Sirs, — Yours of to-day to hand and contents noted. We are particularly struck with the underscoring of the word "*your*" in your letter. We have been under the impression that you represented your journal as being none but a first-class one in every respect, both as to illustrations and reading matter, but the fact of your continual publication of cuts of our buildings, since you state that they have, or rather intimate the same thing, no merit, leads us to believe that you could not have been sincere in your statements, as to the merits of your journal. Your agreement was not to the effect as to our work being published (we had been led to believe that our work had some merits from the fact of your publishing it), but if any architect's work was published, free of charge, both as to cut and name. We have enclosed your reply with a letter of our own to the *American Architect*, asking them to enlighten you more fully, and await their reply before answering you more fully.

Very respectfully yours, X. & Y.

[IT does not seem to us necessary to add anything to this excessively amusing correspondence. Our Western contemporary seems to discover a world of hidden meaning in our own simple statement, but the hiding place is so snug that we doubt if any other can detect it. — EDS. AMERICAN ARCHITECT.]

WANTED, A TRAVELLING COMPANION.

ANNISTON, ALA., July 14, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I expect to take a trip to Europe to see the Paris Exposition and something of the large cities of Europe about the 1st of September, and write to ask you if you know of any young architect or draughtsman that contemplates such a trip about that time. I would like to have some congenial companion, and, as I have been disappointed by one of my friends here, write to ask if you know of any gentleman going over about that time, and, also, to ask your advice as regards places of interest to visit, etc. I am somewhat limited in time (about ten weeks) and also in money, but will have enough to enjoy myself on. I should like to open a correspondence with any gentleman that you think may go over, and believe that two of us can travel much cheaper than one, and also learn a great deal more too.

I am sorry to bother you with these questions, etc., but some day I may be able to return all your kindness by contributions of interest. Respectfully, VOYAGER.

[IT will give us pleasure to put in communication with our correspondent any architect who would like to join forces and purses with him for such a trip. — EDS. AMERICAN ARCHITECT.]

PFEIFFER'S AMERICAN MANSIONS.

MONTREAL, CAN., July 16, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I suppose you did not forget that I filed in due time my adhesion to your idea of publishing the work of the late Carl Pfeiffer. I would be sorry if you could not find among the architects on your side of the line a sufficient number of subscribers to justify the publication of a work which, I doubt not, must be interesting to the whole profession. Should it not be only a *question d'honneur* that not a single architect proud of his lasting reputation should neglect to pay such a slight tribute to an honored *confrère*.

I remain, sir, your obedient servant,

JAS. VENNE, *Architect.*

[WE are extremely obliged to Mr. Venne for raising just this point, for it is one against our raising which there were certain reasons. Up to the present time a very small portion of possible subscribers have sent in their names, and, consequently, the returns to the beneficiaries are likely to be unworthily meagre. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

ACOUSTIC PROPERTIES OF SOME BUILDINGS. — There are some buildings which are so utterly bad from an acoustic point-of-view that even experienced speakers are little better off than novices. The House of Lords has, or used to have, an unenviable reputation in this respect. A story is told of the late Lord Lyttelton that, after exhausting his voice in vain efforts to make his brother peers hear a motion which he wished to propose, he, in despair, wrote it down and asked the clerk at the table to read it out. That functionary, however, was quite unable to decipher the writing, and Lord Lyttelton complained that he was cut off from communication with his fellows. Science has not always been successful in coping with the acoustic difficulty. In 1848, it was so difficult for speakers to make themselves heard in the French Chamber that a committee, consisting of the leading scientific luminaries of the day — such as Arago, Babinet, Dumas (the chemist, not the author of "*The Three Musketeers*"), Becquerel, Chevreul (the centenarian who died the other day), Pouillet, Regnault and Duhamel — was appointed to study the case and suggest a remedy. After numerous experiments they hit on a contrivance, designed on the most scientific principles, which was to make the orator's voice ring like a clarion to the farthest benches. The last state of the speaker, however, was worse than the first: he felt as if his voice was stifled under a huge nightcap, and the highly scientific sound-reflector had to be discarded as a failure. Indeed, modern public buildings are so often defective in this respect that I am not surprised to find M. C. Garnier, who designed the Grand Opéra in Paris, exclaiming dolefully: "The science of theatrical acoustics is still in its infancy, and the result in any given case is uncertain." So impressed is he with the shortcomings of modern architecture as regards the conveyance of sound, that he frankly confesses that, in the construction of the Opera House, he "had no guide, adopted no principle, based his design on no theory"; he simply left the acoustic properties of the building to chance. The result has not been altogether satisfactory, though it has been no worse than in many other buildings where the architect did his best to make the acoustic conditions perfect. One of the most remarkable buildings from the acoustic point-of-view that I have ever seen is the beehive-shaped Temple in Salt Lake City. It holds from 12,000 to 14,000 people, and one can literally hear a pin drop. When I was in the Temple with some travellers in 1882, the functionary corresponding to the verger of ordinary churches stood at the farthest end and dropped a pin into his hat. The sound of its fall was most distinctly audible to all present. The scratching of the pin against the side of the hat was also plainly heard across the whole breadth of the building. The Temple was designed by Brigham Young, who professed to have

been directly inspired by the Almighty in the matter, as he knew nothing of acoustics. The resonance of the building is so loud that branches of trees have to be suspended from the ceiling in several places in order to diminish it. It is likely enough that Brigham Young's inspiration had a not very recondite and purely terrestrial source, for his beehive is only a slight modification of the whispering-gallery in St. Paul's. The bad acoustic properties of buildings may be remedied by what doctors call "palliative treatment." Charles Dickens's experience as a public reader made him a man of ready resource in meeting such difficulties. On one occasion, when he was going to lecture at Leeds, Mr. Edmund Yates, who had spoken in the same hall the evening before, sent him word that the acoustic conditions of the place were very bad. Dickens at once telegraphed instructions that curtains should be hung round the walls at the back of the gallery; by this means he was able to make himself more easily heard. — *The Contemporary Review.*

The Tomb of Alexander. — When I remember the doubts I entertained as to the value of the works that were heralded into the world as belonging to the tomb of Alexander, I can thoroughly sympathize with the sceptical attitude maintained by archæologists here towards the discoveries of Sidon. I have recently been at Constantinople, and have been shown the photographs of the sarcophagi by Hamdy Bey. I think it right to record my conviction that the discovery seems to me one of the most important made in this century. Nay, I venture to believe that, excepting the Elgin marbles and the Hermes of Praxiteles at Olympia, no works of ancient Greek art have been found of greater artistic interest and merit. There are several sarcophagi of various dates, showing an interesting development of tombs of the Lycian type, some reminding us of the monuments from Xanthos in the British Museum. But there is one of supreme beauty, with pediments containing reliefs, on which the polychromatic additions are wonderfully preserved. These reliefs are unique in character. In style they remind us of the friezes from the mausoleum of Halicarnassus, and can hardly be later than the beginning of the third century, B. C. The subject of one pediment, which contains a representation of a lion hunt, is quite clear, inasmuch as it has an undoubted portrait of Alexander. Now, when we remember that, according to Pliny and Plutarch, a group at Delphi representing the famous lion hunt of Alexander is attributed to Lysippus and Leochres, it is highly probable that some relation subsists between this relief and the bronze group at Delphi There are also analogies between this group and the famous Neapolitan mosaic. If I remember rightly, a head on the right in this relief reproduces the head on the gold stater of Philip. The other pediment, also containing a portrait of Alexander, represents the execution of some warrior or prisoner. I do not venture at present to offer an interpretation of this. Hamdy Bey does not assert positively that this is the tomb of Alexander, but I feel that he will be justified in pointing to the possibility of such being the case. My acquaintance with the works is merely based upon the photographs. The works themselves are in cases at Constantinople, awaiting the completion of the museum which is being built to house them. We may also hope that, before long, Hamdy Bey's publication of these works will make them properly known to the public. Meanwhile I feel assured that he has done all in his power to act in the interest of science. That he desires to preserve them for his country is a patriotic feeling with which all patriotic men will, or ought to, sympathize. — *Charles Waldstein, in London Athenæum.*

Comparative Strength of Steel and Iron. — The substitution for bolts, nuts, bars, plates, etc., of a tough, soft, manganese steel, in place of iron, was sometime since proposed. Recently, tests of a severe and decisive character have been made, with a view to ascertain whether bolts of such material are really strong and reliable as against the very heavy stresses and strains to which they are sometimes subject, and to determine whether the steel of which they are made would withstand bending, hammering close, and rough treatment in various ways, or whether such steel would only withstand heavy stresses slowly applied. Under these trials the metal is found to exhibit a toughness unsurpassed by any other, being easily nicked and bent round away from and close up at the nick. Bolts up to five-eighths inch were tested by holding the nut fast in a vise, and then hammering the bolt until it was bent downward at the screwed part through an angle of 120 degrees, then taken out and doubled down and closed up with a heavy hammer on an anvil; but though the screw-threads were thus jammed up and compressed upon each other on the inside of the bend, and opened out to double their pitch on the outside, the steel did not break. — *Exchange.*

A Subterranean Canal. — The strangest canal in the world is one I never saw mentioned in any book or newspaper. It is a canal sixteen miles long, between Worsley and St. Helens, in the north of England, and is underground from end to end. In Lancashire the coal mines are very extensive, half the country being undermined, and many years ago the Duke of Bridgewater's managers thought they could save money by transporting the coal underground, instead of on the surface. So the canal was constructed, the mines connected and drained at the same time. Ordinary canal-boats are used, but the power is furnished by men. On the roof of the tunnel-arch are cross-pieces, and the men who do the work of propulsion lie on their backs on the coal, and push with their feet against the cross-bars on the roof. Six or eight men will draw a train of four or five boats, and, as there are two divisions in the tunnel, boats pass each other without difficulty. — *St. Louis Globe-Democrat.*

Government Rights in Navigable Water. — On June 4, in the Circuit Court of the United States, the right of the United States to lands at the bottom of the navigable waters in the several States, for a lighthouse site or other purposes connected with commerce, was decided. Judge Morris decided that under the commercial clause of the Constitution giving the General Government the right to regulate commerce, the United States has the paramount title to the bottom ground of all navigable waters in the States, and may take possession of such ground for purposes of commercial protection, development and regulation, without condemnation or compensation. — *Exchange.*

TRADE SURVEY

The extraordinary production of and accumulation of wealth during the past twenty or thirty years has begun to overflow its banks and rush into the open country in the shape of trusts, syndicates and combinations of various kinds. The business interests are in a state of transition from individualism, which politically corresponds to the feudalism of past centuries into congregated effort which corresponds politically to the republican form of government existing openly in the United States, and just beneath the surface of society in many other countries. This organization of business interests will gather strength as it goes, and will supplant much of former methods and indirectly control what it does not supplant. While no apology is intended for the tyrannical manifestations of power incident at all times to collective strength, but especially now when the new forces are trying on their first pairs of new boots, the fact might as well be borne in mind that, from an economic standpoint, these new aggregating forces must of necessity in time transform all business methods, rendering possible even a new and different banking system freed from some of the worst defects of the systems invented in Threadneedle Street. No general review of the causes and agencies now at work, or which are likely to be generated soon, will be marched by in dress-parade at this time. The only purpose of a passing allusion is to indicate that there is a mighty factor beneath the surface which will bring its pregnant results in due time to the attention, and more or less unwilling recognition of the commercial and financial world. The month of July has thus far been a very good one. Fully as much business has come to the counting-rooms and brokers' offices, and mill and factory offices as was expected. Much of it slipped in at old prices, as business men were anxious to keep the wheels of trade turning. Some estimate the advance in prices since spring at 5, some at 10 per cent, but, be this as it may, an improvement in prices has set in in many avenues which may or may not be maintained according as general business interests are managed. The building interests have entered upon the last half of the year with renewed zeal. The lumber dealers will close the season, most probably, with less accumulations of stock than last year, even with a great falling off in railroad-building. This year's railroad work so far amounts to about as much as last year. Up to July 1, the steel-rail orders were for 963,550 tons, against 934,587 tons last year, and deliveries, 575,000 tons, against 585,558 tons. The continued agitations and the threatening attitude of prominent lines to each other and the threats of an attack upon the national railway legislation itself, all keep capital that might go into railroads diffident, but perhaps profitably so. English capital is not above brick-yards, and even much smaller interests have been the subject of observation of special experts armed with commissions to spy out some safe field for investment. Without venturing into theorizing, it may be said that while there will always be a class who can live from their investments, the agencies are, in reality, narrowing those opportunities. The great outflow of capital after paying investments is proof of this. Railroad competition has made indiscriminate securities in railway bonds dangerous. The greater the investments and the wider the field of syndicate operations, the more unstable will be the high dividends and the assurance of competency from investments, without some accompanied personal supervision or co-operation. In other words, the dollar with a brain behind it will beat the dollar with a syndicate or trust behind it, but not while we are in the transition state.

The agricultural implement manufacturers and agents have begun to purchase material and supplies quite largely. One party, last week, purchased 800 tons of steel bars and special shapes. A harvesting-machine builder bought 3,000 tons of merchant-bars. Iron users are hurrying in orders for plates and structural iron, and the market was taken by surprise with the announcement of a $6 cut on steel plates. Railroad reports exhibit a steady increase in traffic. Cars are scarce on many roads. The demand for wood-working machinery is once more increasing. American hardware is growing in favor in foreign countries. The exports of agricultural implements for nine months foot up $2 252,000, an increase of $520,000 over same previous fiscal term. In general machinery, the percentage of increase was 28. The exports of same and tools for nine months footed up $1,480,000, a gain of $300 000 over 1888. The gain in the export value of locomotives was over 50 per cent. Although the total gain in nine months was only $3,000,000 over nine months of the previous fiscal year, it is important and encouraging as an indication of what there is to be accomplished. American agents will learn a great deal at Paris, and they will make that knowledge a starting-point to introduce American manufactured products to nations that know very little of us. The export trade in cereals, petroleum, lumber and cotton will naturally increase, but the most valuable increase will be in products representing a high degree of special skill. Heretofore American manufacturers have been discouraged by the cheaper labor, longer hours, established commercial and financial facilities already established with foreign countries, and by other advantages, but they are now quickly learning how to make what foreign nations want, and how to sell them. The past season has been the best for window-glass production ever known. The production at home was 3,200,000 boxes; importation, 1,250,000 boxes. A new style of glass has been introduced at St. Louis, and the tank system of making glass in immense quantities is giving great satisfaction. Several new glass factories are to be erected. Lake iron-ore sales this year will probably reach $6,500,000, and iron-makers are laying their plans for a very busy winter. Municipalities are now inclined to sell whatever franchises are asked for cash, and, as such a policy promises to lessen the assessments for taxation purposes, it will probably meet with favor. This tendency was lately shown in Chicago when the Standard's request to construct and operate a pipe-line was defeated. With reference to the chronic apprehensions of a giving out of the petroleum surplus, geological authority in Pennsylvania states that the Pennsylvania and Virginia belt of 204 square miles has yielded 340,000,000 barrels, and the estimated future yield is 2,000,000,000 barrels. The yield per square mile for fifteen years has been 1,000,000 barrels. There is now something like 12,000,000 barrels of petroleum in the tanks in Ohio. Oil stocks have been reduced since June 1 from 15,668,331 barrels to 15,258,863 barrels, a decrease of 409,468 barrels. Great enterprise is displayed, so far as blind pushing is concerned, in several other States where oil land exists, but more money is lost than gained. Last week, a twelve-mile pipe-line four inches in diameter was ordered in New York. A great deal of pipe-laying is in contemplation, and both cast and wrought iron pipe-mills are full of orders.

S. J. Parkhill & Co., Printers, Boston.

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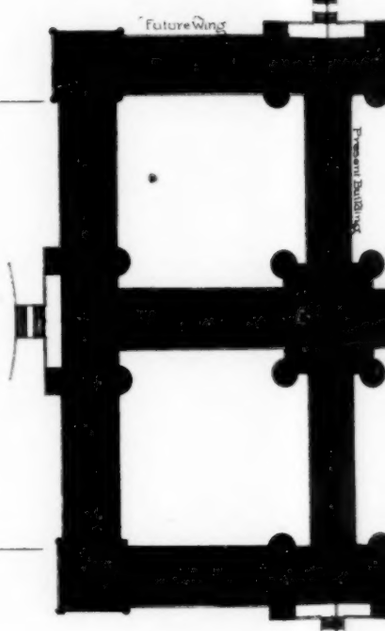
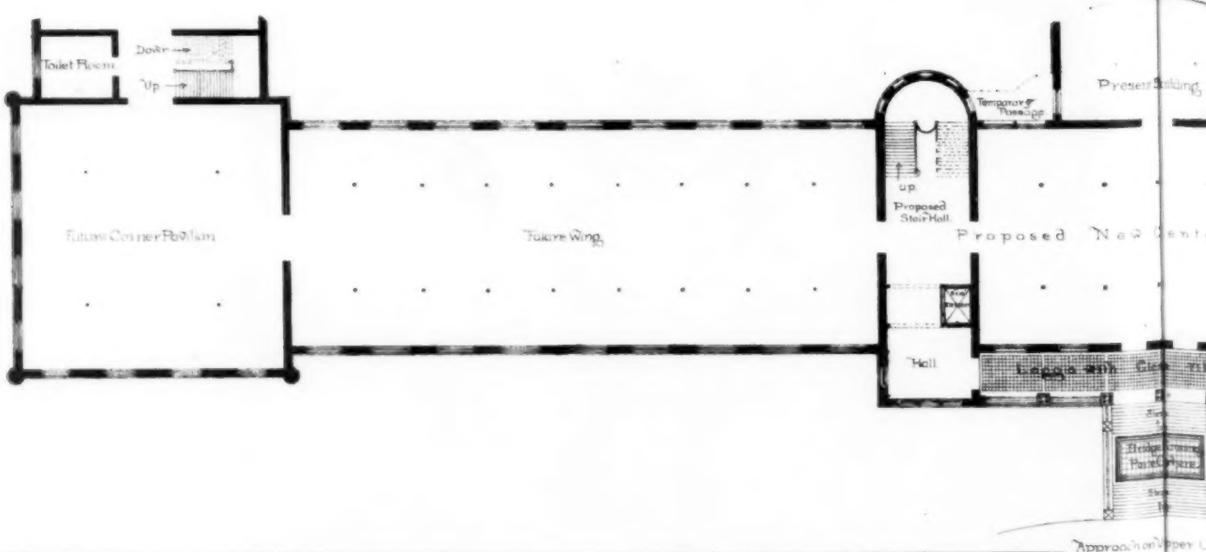
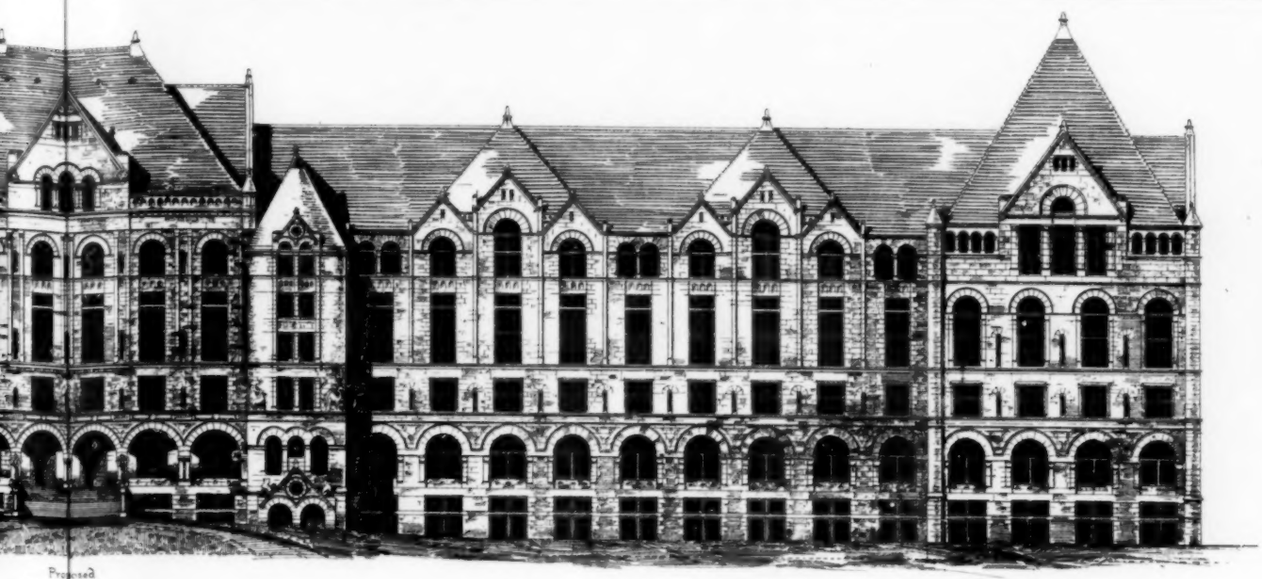
Elevation of Entire South Front Showing

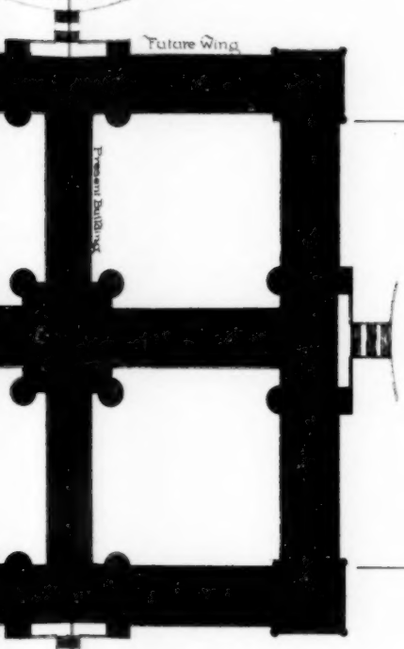
Competitive Design
for the
Proposed New Centre Pavilion on South Side
American Museum Of Natural History







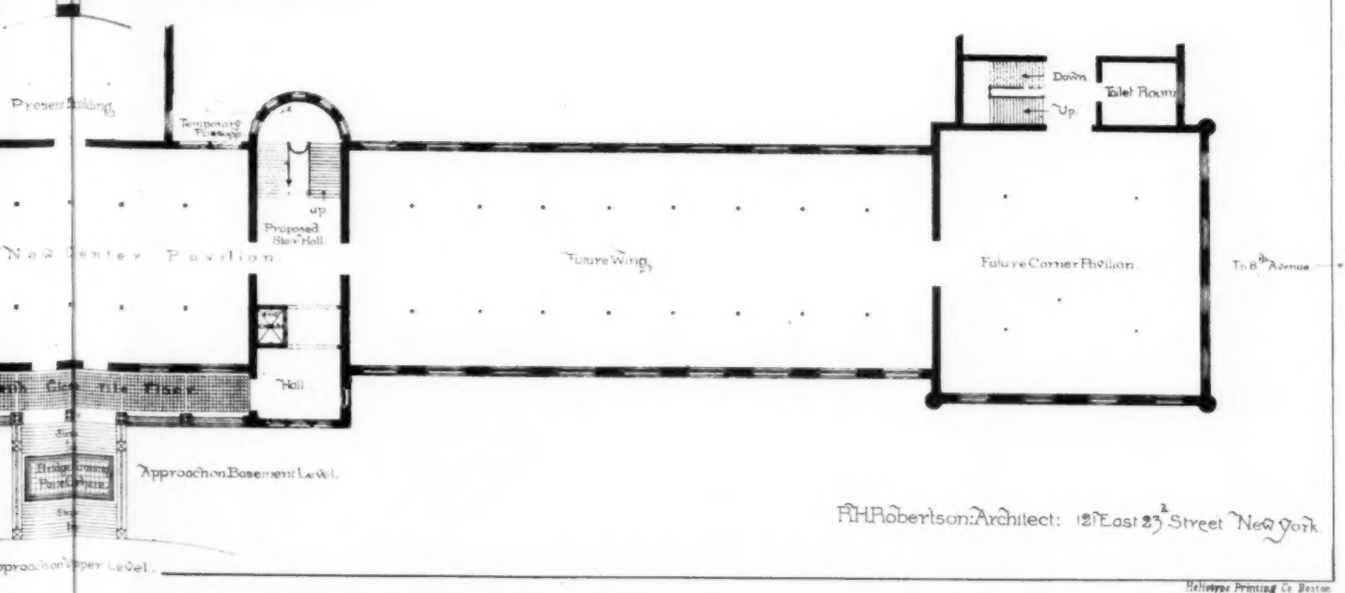
Proposed Centre Pavilion With Future Wings :



General Plan of First Floor

On Level With Present Bird Floor

: Showing Future Wings and Center Pavilions :

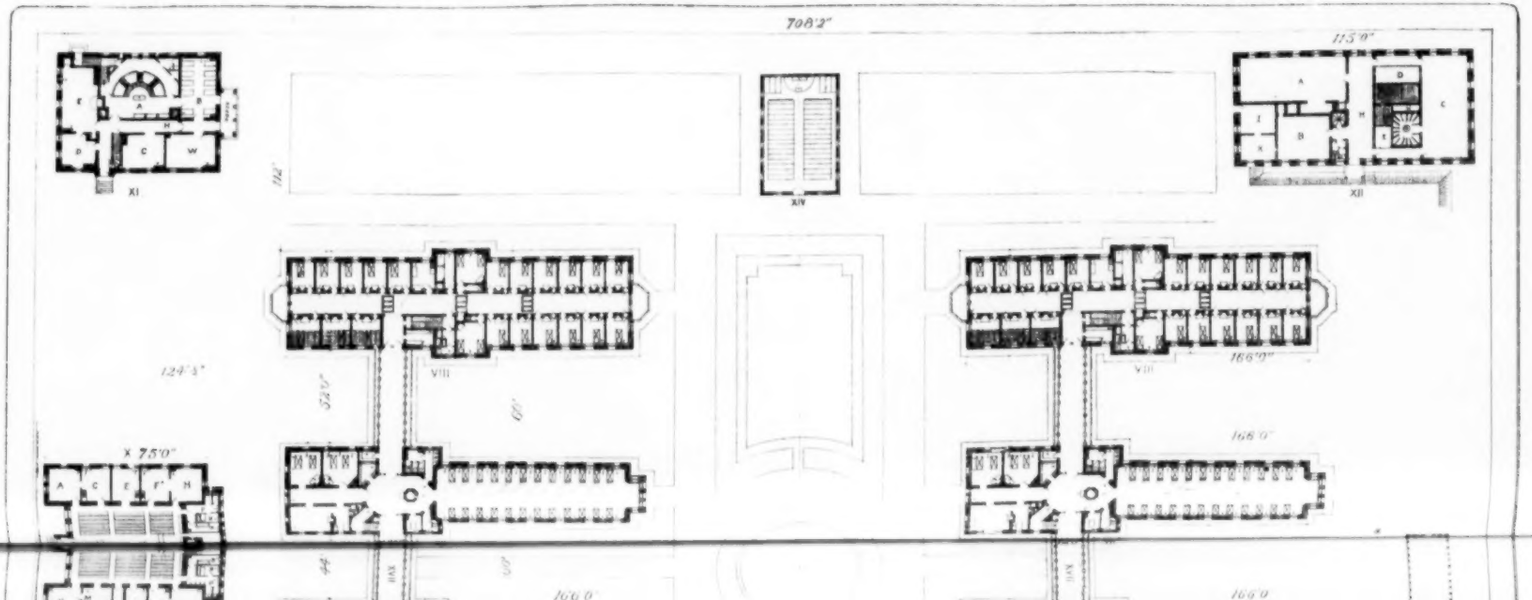


A.H. Robertson: Architect: 121 East 23rd Street New York.

Heliotype Printing Co. Boston.

THE JOHNS HOPKINS HOSPITAL,

BALTIMORE, MD., U. S. A.



JEFFERSON ST. 60 wide.
BROADWAY. 80 wide
MONUMENT ST. 60 wide

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